

OverView DR120



Service Manual

R9842530

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Federal Communications Commission (FCC Statement)

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user is encouraged to try to correct the interference by one or more of the following measures.

Introduction to the user :

If this equipment does cause interference to radio or television reception, the user may try to correct the interference by one or more of the following measures :

- Re-orientation of the receiving antenna for the radio or television.
- Relocate the equipment with respect to the receiver.
- Plug the equipment into a different outlet so that the equipment and receiver are on different branch circuits.
- Fasten cables connectors to the equipment by mounting screws.



The use of shielded cables is required to comply within the limits of Part 15 of FCC rules and EN55022.

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1. SAFETY

1.1 Safety Instructions



WARNING: Before Removing/Replacing any projector components, turn off the Main Power Switch and unplug the Main AC power cable

Safety Instructions

1. Before returning an instrument to the customer, always make a safety check of the entire instrument, including, but not limited to, the following items:
 - a) Be sure that no built-in protective devices are defective and/or have been defeated during servicing. (1) Protective shields are provided on this chassis to protect both the technician and the customer. Correctly replace all missing protective shields, including any removed for servicing convenience. (2) When reinstalling the chassis and/or other assembly in the cabinet, be sure to put back in place all protective devices, including, but not limited to, insulating materials, barriers, covers/shields, and isolation resistor/capacitor networks. Do not operate this instrument or permit it to be operated without all protective devices correctly installed and functioning. Servicers who defeat safety features or fail to perform safety checks may be liable for any resulting damage.
 - b) Be sure that there are no cabinet openings through which an adult or child might be able to insert their fingers and contact a hazardous voltage. Such openings include, but are not limited to, (1) excessively wide cabinet ventilation slots, and (2) an improperly fitted and/or incorrectly secured cover panels.
 - c) Leakage Current Hot Check. With the instrument completely reassembled, plug the AC line cord directly into a 220 V AC outlet (Do not use an isolation transformer during this test). Use a leakage current tester or a metering system that complies with American National Standards Institute (ANSI) C101.0 Leakage Current for Appliances and Underwriters Laboratories (UL) 1410, (50.7). With the instrument AC switch first in the on position and then in the off position, measure from a known earth ground (metal waterpipe, conduit, etc.) to all exposed metal parts of the instrument (antennas, handle bracket, metal cabinet, screwheads, metallic overlays, control shafts, etc.). especially any exposed metal parts that offer an electrical return path to the chassis. Any current measured must not exceed 1.5 mA. Reverse the instrument power cord plug in the outlet and repeat test. ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE INSTRUMENT TO THE CUSTOMER OR BEFORE CONNECTING ACCESSORIES.

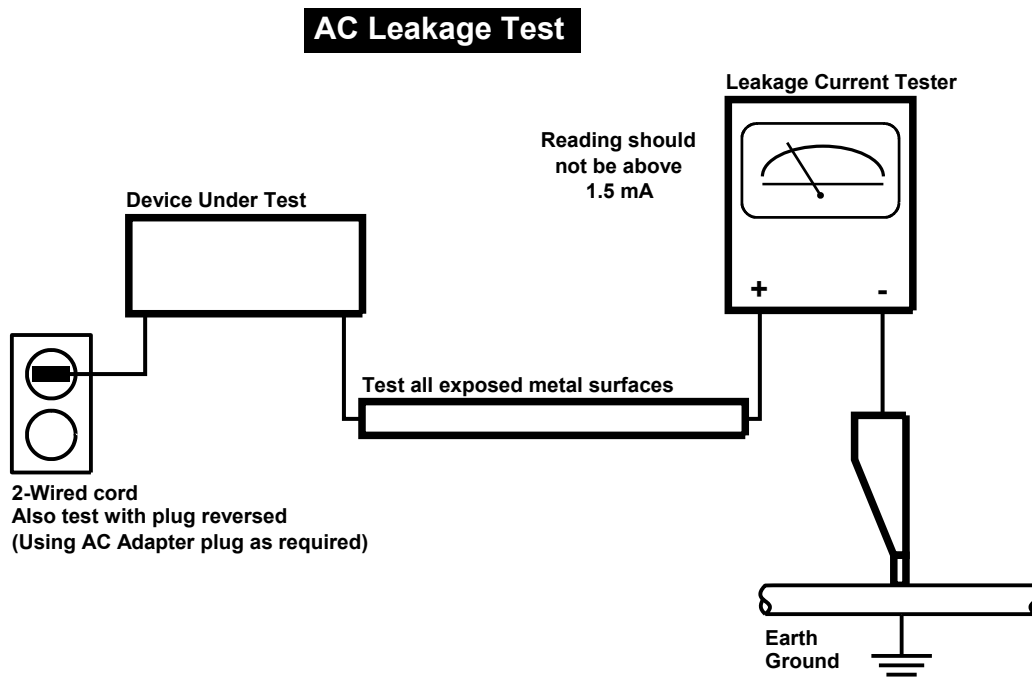


Image 1-1
AC Leakage Test

- d) Ultraviolet Radiation exposure - Warning: This lamp can cause serious skin burn and eye inflammation from shortwave ultraviolet radiation if not operated in enclosed fixtures. DO NOT operate this lamp in a fixture with a missing or broken lens cover.
 - e) Ozone: Operating lamp generates ozone gas which is harmful to the respiratory system. Therefore the lamp should be operated in adequately ventilated equipment.
2. Read and comply with all caution and safety-related notes on or inside the projector cabinet or on the projector chassis, or on the picture tube.
 3. Design Alteration Warning - Do not alter or add to the mechanical or electrical design of this apparatus. Design alterations and additions, including, but not limited to, circuit modifications and the addition of items such as auxiliary audio and/or video output connections, might alter the safety characteristics of this apparatus and create a hazard to the user. Any design alterations or additions may void the manufacturer's warranty and may make you, the servicer responsible for personal injury or property damage resulting therefrom.
 4. Lamp explosion Protection Warning - The lamp in this projector operates with a high internal pressure and there is a slight risk that the lamp may explode, particularly if it is used beyond its rated life of 1000 hours. Do not remove, install, or otherwise handle the lamp in any manner without first putting on shatterproof goggles equipped with side shields. People not so equipped must be kept safely away while lamps are handled. Keep the lamp away from your body. For continued explosion protection, replace the lamp only with one of the same type number. Always replace the lamp before the rated life time.

5. Hot Chassis Warning - This projector chassis has two ground systems: the primary ground system is formed by the negative voltage of the rectified mains (power) and is only used as a reference in primary circuits; the secondary ground system is connected to earth ground via the earth conductor in the mains (power) lead. Separation between primary and secondary circuits is performed by the safety isolation transformers. Components bridging this transformers are also safety components and must never be defeated or altered. All user-accessible conductive parts must be connected to earth ground, or are kept at SELV (Safety Extra Low Voltage).
6. Observe original lead dress. Always inspect in all areas for pinched, out-of-face, or frayed wiring. Do not change spacing between components, and between components and the printed-circuit board. Check AC power cord for damage. Take extra care to assure correct lead dress in the following areas:
 - a) near sharp edges
 - b) near thermally hot parts - be sure that leads and components do not touch thermally hot parts
 - c) the AC supply
 - d) high voltage
7. Components, parts, and/or wiring that appear to have overheated or are otherwise damaged should be replaced with components, parts, or wiring that meet original specifications. Additionally, determine the cause of overheating and/or damage and, if necessary, take corrective action to remove any potential safety hazard.
8. **PRODUCT SAFETY NOTICE** - Many electrical and mechanical parts have special safety-related characteristics some of which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part in BARCO service data parts list might create shock, fire, and/or other hazards. Product Safety is under review continuously and new instructions are issued whenever appropriate. For the latest information, always consult the appropriate current BARCO service literature.
9. Do not spray chemical on or near this instrument or any of its assemblies.
10. **Electrostatically Sensitive (ES) Devices** Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity:
 - a) Immediately before handling any semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Wear a commercially available high impedance discharging wrist strap device.
 - b) After removing an electrical assembly equipped with ES devices, place the assembly on a static dissipative surface such as a 3M No 8210 table mat, to prevent electrostatic charge buildup or exposure of the assembly.
 - c) Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
 - d) Do not remove a replacement ES device from its protective package until immediately before you are ready to install it (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminium foil or comparable conductive material).
 - e) Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed. **CAUTION:** Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
 - f) Minimize bodily motions when handling unpacked replacement ES devices (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device).

2. GENERAL INFORMATION

Overview

- Interconnection diagram
- Conventions
- Connector Instructions

2.1 Interconnection diagram

Interconnection diagram

2.2 Conventions

Projector orientation

In the following procedures, references to location (left, right, front, rear, top, bottom) on the projector are made as shown in the following image.

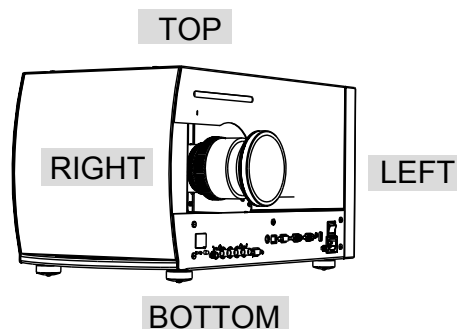


Image 2-1

Spare abbreviations

Each available spare is indicated with one of the following abbreviations:

Abbreviation	Description
NR	Non repairable
CO	Consumable
FR	Factory Repairable
LR	Locally repairable

2.3 Connector Instructions



When needed, remove cable straps to easily disconnect a connector, when finished always replace with new cable straps and tie up the cables to their initial position.



WARNING: Always respect the ES (Electrostatically Sensitive) Instructions .
Do not use any kind of tools when disconnecting a connector.

Board To Board Connector

Used here to connect the PMP connection unit (Conhead FB PMP) to the the PMP.

- Board To Board Connectors are mounted directly on the Board, do not use any tools when disconnecting these connectors.
- To disconnect carefully lift the board .

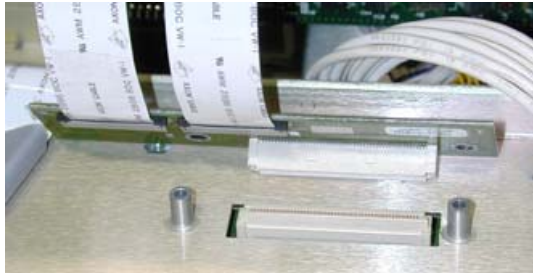


Image 2-2
board to board disconnected

Mini Coax Connector

Used here to connect the RGB input signal to the PMP board

- Do not bend the mini coax connector when pulling it out of the mini coax socket, pull it out in a straight way.

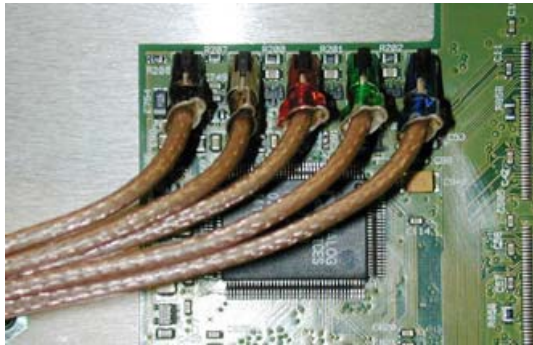


Image 2-3

- Be extra careful when (dis)connecting the mini coax, keep in mind the mini coax socket is just soldered on the board.

Flat Cable Connector: Type 1

This type of connector can be found on the CPU, the RGB Input.

- Do not use any tools when (dis)connecting a flat cable connector, otherwise damage may occur on the mini locks.
- Disconnect by simultaneously pulling out the 2 mini locks on both sides of the flat cable connector.



Image 2-4

- Do not touch the contacts of the flat cable when removing/inserting the flat cable otherwise damage may occur by oxidation of these contacts.
- Do not bend the flat cable, otherwise internal cable damage may occur.
- Insert the flat cable in a straight way into the flat cable connector.
- Connect the flat cable by simultaneously pushing the mini locks on both sides of the flat cable connector.

Flat Cable Connector: Type 4

This type of connector can be found on the formatter.

- Do not use any tools when (dis)connecting a flat cable connector, otherwise damage may occur on the lock.
- Disconnect by pushing the lock upwards.

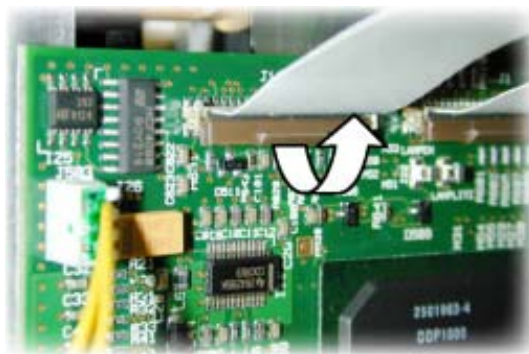


Image 2-5

- Do not touch the contacts of the flat cable when removing/inserting the flat cable otherwise damage may occur by oxidation of these contacts.
- Do not bend the flat cable, otherwise internal cable damage may occur.
- Insert the flat cable in a straight way into the flat cable connector.
- Connect the flat cable by pushing the lock downwards.

Flat Cable Connector: Type 5

Used on the interconnection unit.

2. General Information

- Do not use any tools when (dis)connecting a flat cable connector, otherwise damage may occur on the lock.
- Do not touch the contacts of the flat cable when removing/inserting the flat cable otherwise damage may occur by oxidation of these contacts.
- Do not bend the flat cable, otherwise internal cable damage may occur.
- Insert the flat cable in a straight way into the flat cable connector.
- Disconnect by simultaneously pulling out the 2 mini locks on both sides of the flat cable connector.

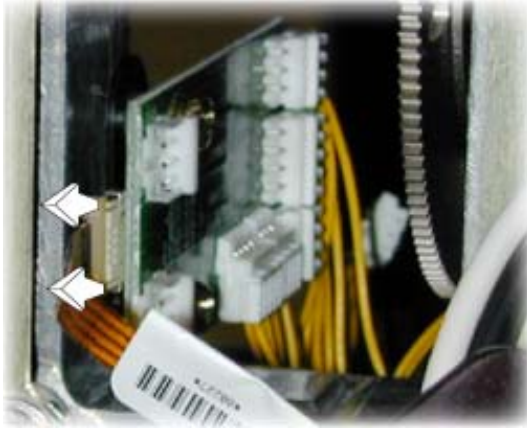


Image 2-6

3. SPARE PARTS LIST

3.1 Spare parts list

Which spares are available for the OverView DR120

Following spares can be ordered:

Art number	Description	Category
B400520K	LPS Driver	FR
R763284K	RGB input	FR
R7633996K	CPU	FR
R763769K	Formatter (without DLP chip)	FR
R763834K	SMPS	FR
R763943K	PFC	FR
R764108K	PMP	FR
R7630355K	Remote Control	NR
R763294K	Light Sensor	NR
B400548K	DLP Chip	NR
B400614K	DLP Interposer	NR
R763522K	Interface Version 3	NR
R763925K	Conhead FB PMP	NR
R764047K	Display	NR
R825020K	Color wheel + motor	NR
R764101K	Color Wheel Sensor	NR
R764102K	Dimmer sensor	NR
R764199K	CW CN	NR
R763942K	Fan CTRL	FR
B557933K	Stepper Motor Driver	NR
R825140K	Top Housing	NR
R823869K	L-Pipe	CO
R825179K	Filter Assembly	CO
B324533K	Fan Power	NR
B32459031DK	Big Fan lamp	NR
B3245982DK	Small Fan Lamp	NR
B358014K	Motor	NR
B356331K	Feet (4x)	NR
R825933	1 Lamp	CO

Table 3-1

4. SOFTWARE

Overview

- Software upgrade
- Optical calibration software

4.1 Software upgrade

Description

The software upgrade of the projector is done via the RS232 interface.

The last up to date software can be downloaded from the Barco's secured website.

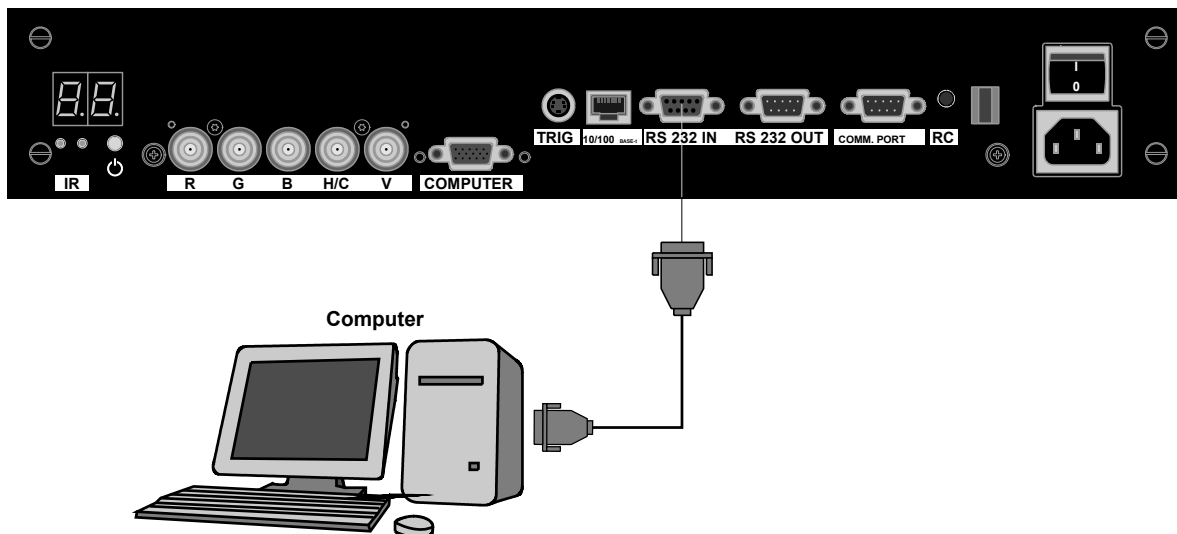


Image 4-1

Necessary tools

Barco LCD/DLP Projector Code Control Program (download program)

How to upgrade the software ?

1. Connect the PC to the projector via the RS232 port
2. Switch the projector to standby
3. Start the download program (image 4-2)

Tip: The download program can also be downloaded from the secured website
4. set the address
5. set the communication port
6. set the baudrate

Tip: The minimal baudrate is 9600 b/s
recommended baudrate = 115200 b/s

The baudrate is detected as soon as a baudrate value is chosen.

The detection is displayed in the window.

7. Click the *Browse* button and select the previously downloaded source file (.bin). (image 4-3)
8. Press the *Download* button to start the download process.

A successful download is indicated with a green spot in the right bottom corner of the download interface

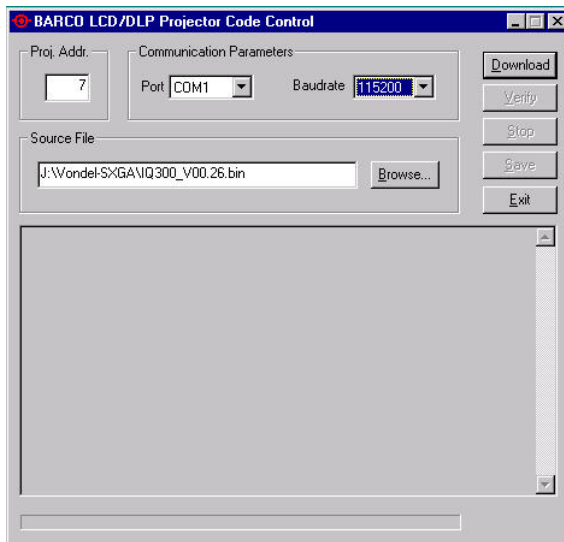


Image 4-2
download interface



Image 4-3
Download program browser



If the download has not been terminated successfully restart the projector (main switch), restart the download program (exit + start) and repeat the download procedure.

4.2 Optical calibration software

What can be done ?

The optical calibration software (wm_optics.exe) is used for the calibration of following parts:

- Color wheel: to determine and/or store the color wheel index, "Color wheel index adjustment", page 68
- Light sensor, "Light sensor calibration", page 57
- Primary Color Modulation

Setup

1. Connect the projector the RS232 cable to a PC .
2. Open the software (wm_optics.exe)

In the upper left part of the window, four symbols appear (image 4-4)

3. The symbol on the left (a connector) leads you to a new window *Communication settings*.

See image 4-5.

4. Define the communication parameters to establish a connection between the computer and the projector. This includes the projector address, and the computer's communication port used.

Note: When the second symbol from the left is highlighted, this indicates that there is no connection to the projector yet.

If this button is pressed, the program tries to connect to the projector.

If the communication settings are correct, the third symbol from the left will become highlighted, while the second one will become transparent.

The third symbol indicates that a running connection is present.

The uttermost right button (the key) is a button that has to be pressed to enable some extra features in some versions of the software (lifetime test, demo mode).

It also makes it possible to download data to the projector and make this data the default values to be used with this projector.

5. Press *Comm settings...*

This leads us to an additional window, where the projector's baud-rate has to be entered.

The rest of the parameters should not be changed!

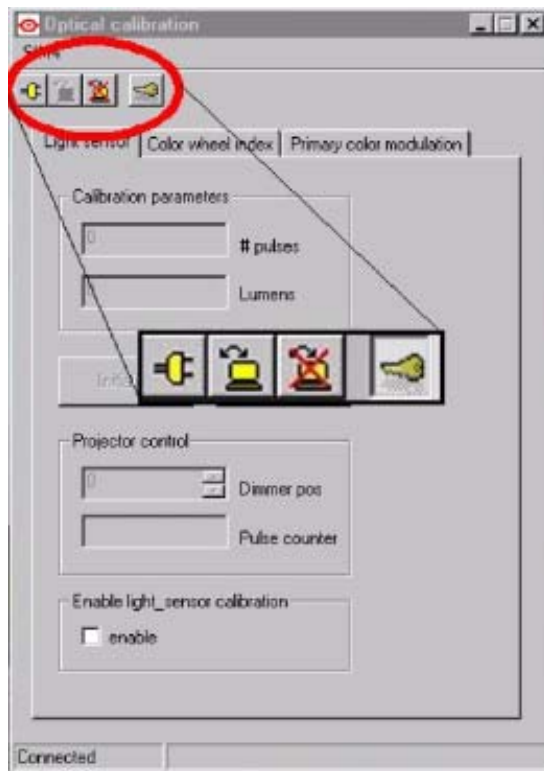


Image 4-4



Image 4-5

5. BOARD LOCATION

Overview

- Board Access
- Projector Front section
- Projector Back section

5.1 Board Access

Unfolding the projector

The projector allows a quick access of most board and optical elements.

Basically the projector's general configuration can be summarized as follows:

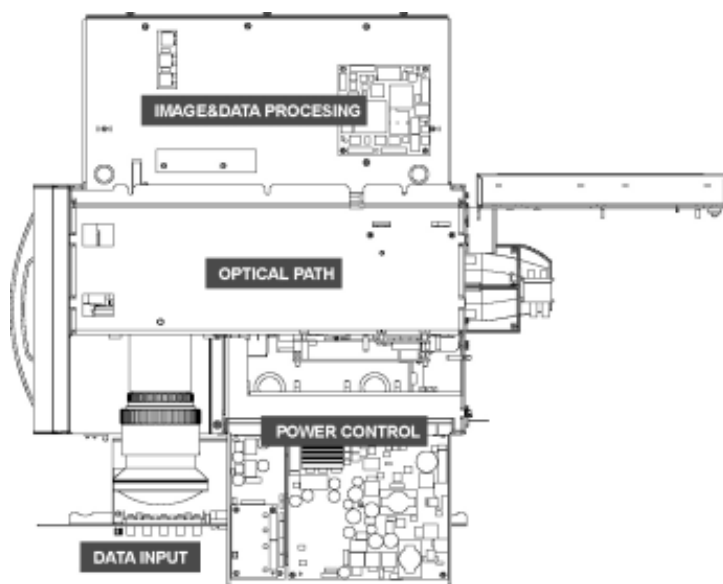


Image 5-1
Top view of the projector: all panels opened

5.2 Projector Front section

Front view

The projector's front section contains mainly the power control boards

5. Board Location



Image 5-2

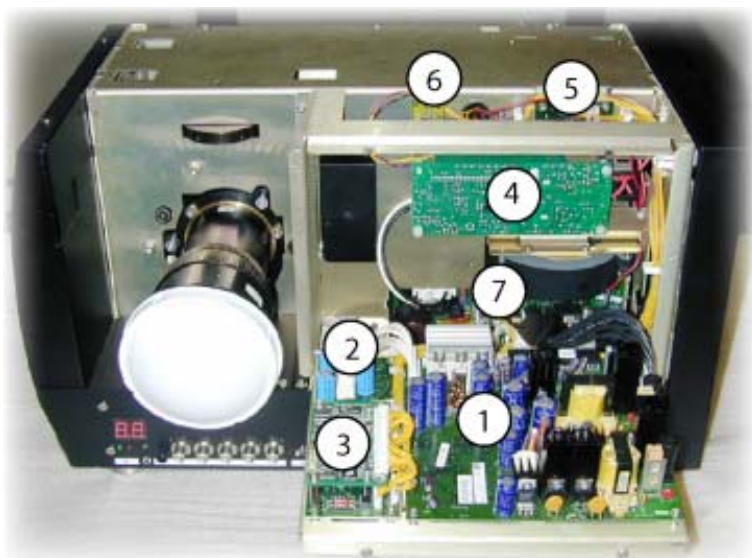


Image 5-3

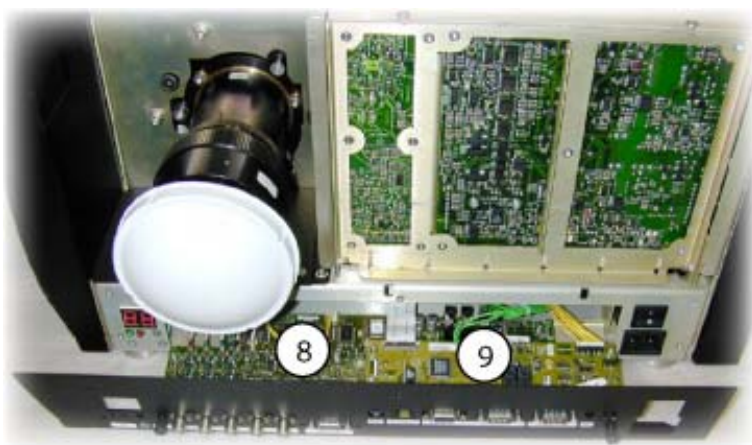


Image 5-4

Image	Description	Partnumber	
1	SMPS	R763834K	FR
2	Fan Ctrl	R763942K	FR

Image	Description	Partnumber	
3	Stepper Motor Driver	B557933K	NR
4	LPS Driver	B400520K	FR
5	fan connector board	R763942K	FR
6	Ambient temp sensor	R762790K	NR
7	Power Factor Corrector	R763284K	FR
8	RGB input	R763284K	FR
9	Communication Interface	R763522K	NR



The fan connector board is delivered along with the fan ctrl board in the same spare kit R763942K

How to access the front section ?

1. Loosen the 2 screws on the topside
2. Rotate the front panel (image 5-5)

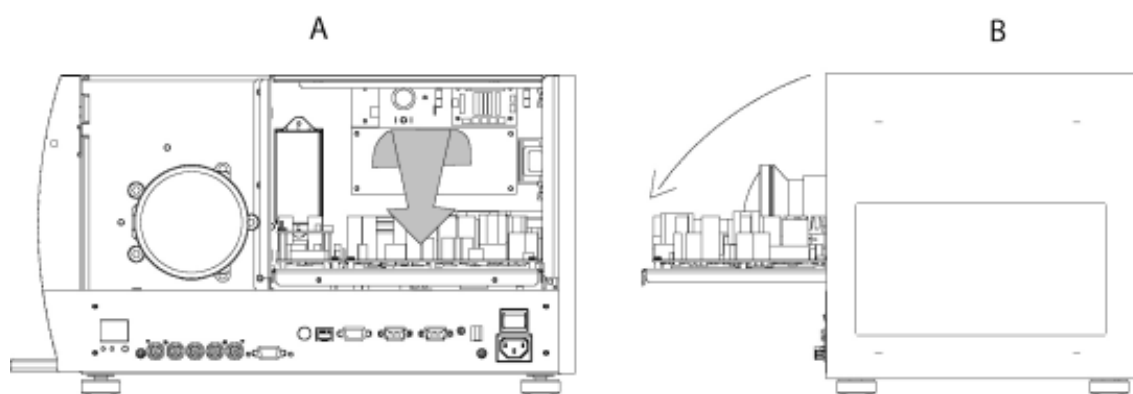


Image 5-5

A Front view: panel opened

B Right view: panel opened

5.3 Projector Back section

Back view

The back section of the projector contains mainly the image and data processing boards

5. Board Location

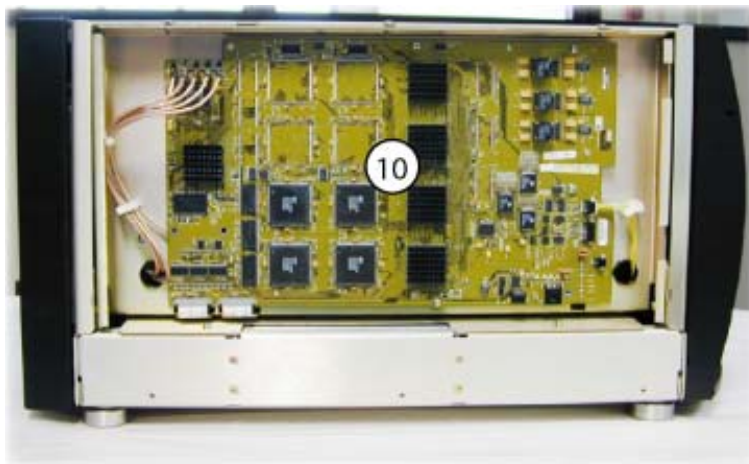


Image 5-6

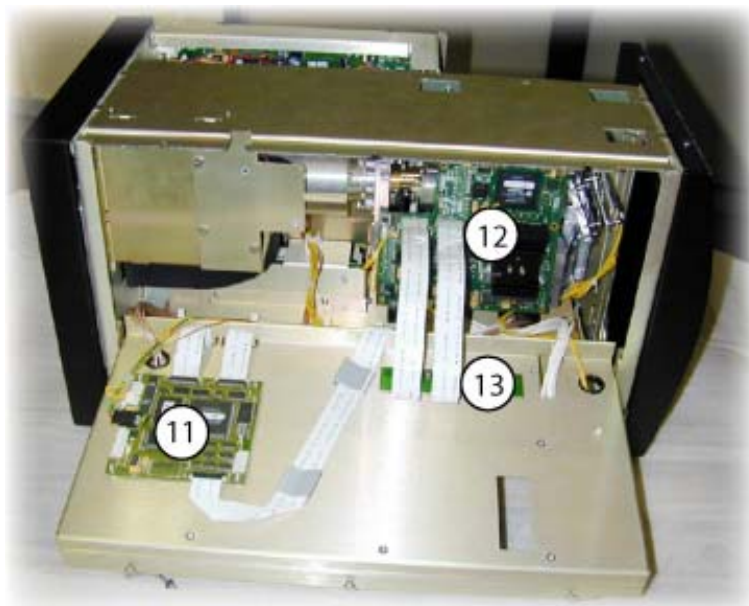


Image 5-7

Image	Description	Partnumber	
10	PMP	R764108K	FR
11	CPU	R7633996K	FR
12	Formatter (DLP chip excl.)	R763769K	FR
13	Conhead FB PMP	R763925K	NR

How to access the back section

1. Loosen the 3 screws on the topside
2. Rotate the back panel (image 5-8)

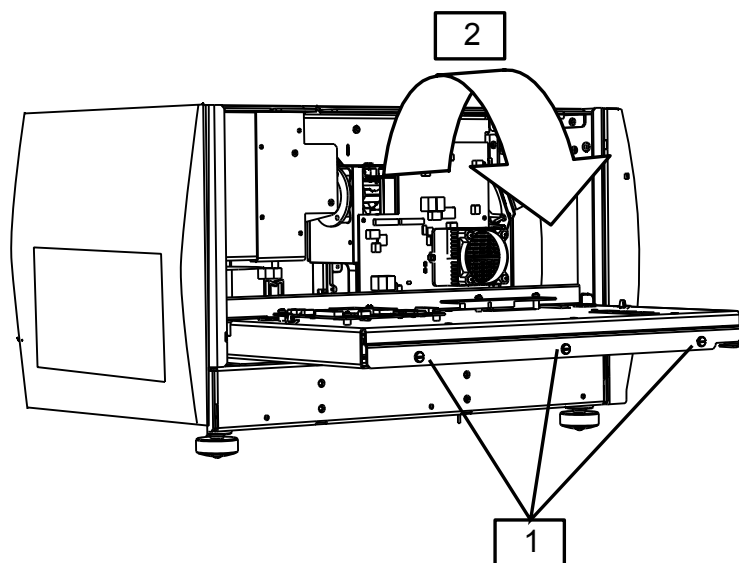


Image 5-8

6. COMPONENT LOCATION

Overview

- Optical Components
- Mechanical component location

6.1 Optical Components

Schematic description of the optical path

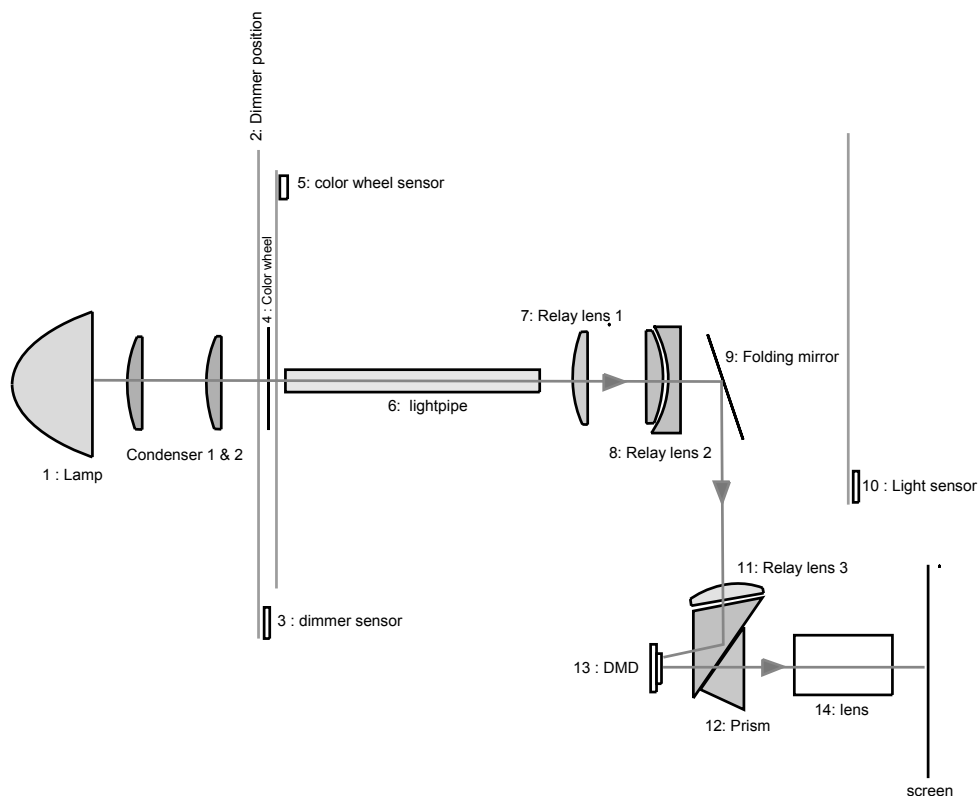


Image 6-1

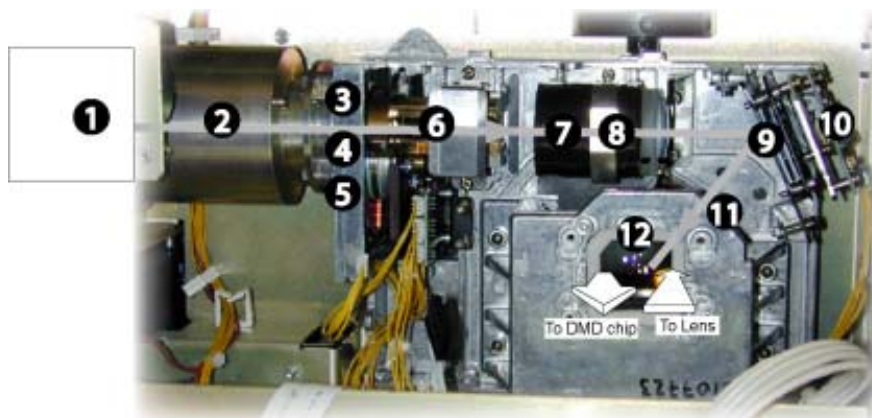


Image 6-2

6. Component location

Image	Partnumber	Description	
1	R825933	lamp kit	CO
2	B358014K	dimmer	NR
3	R764102K	dimmer sensor	NR
4	R825020K	color wheel+motor	NR
5	R764101K	color wheel sensor	NR
6	R823869K	Lightpipe	CO
10	R763294K	Light sensor	NR
13	B400548K	DLP chip	NR
	B400614K	DLP interposer	NR

6.2 Mechanical component location

Fan location



Image 6-3
right view, door open



Image 6-4
lamp top fan location (lamp removed)

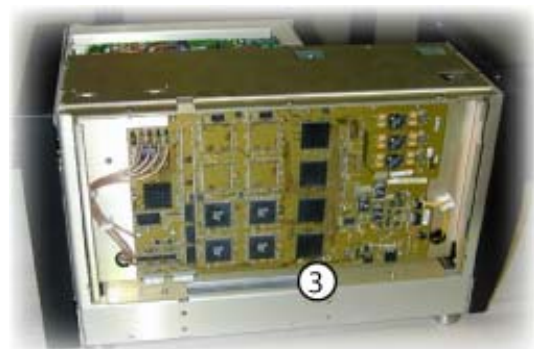


Image 6-5
back view, panel open

Image	Partnumber	Description	
1	B324533K	power fan	NR
2	B32459031DK	lamp fan	NR
3	-	Warp fan	-
4	B3245982DK	lamp top fan	NR

Dimmer Motor and Sensor location

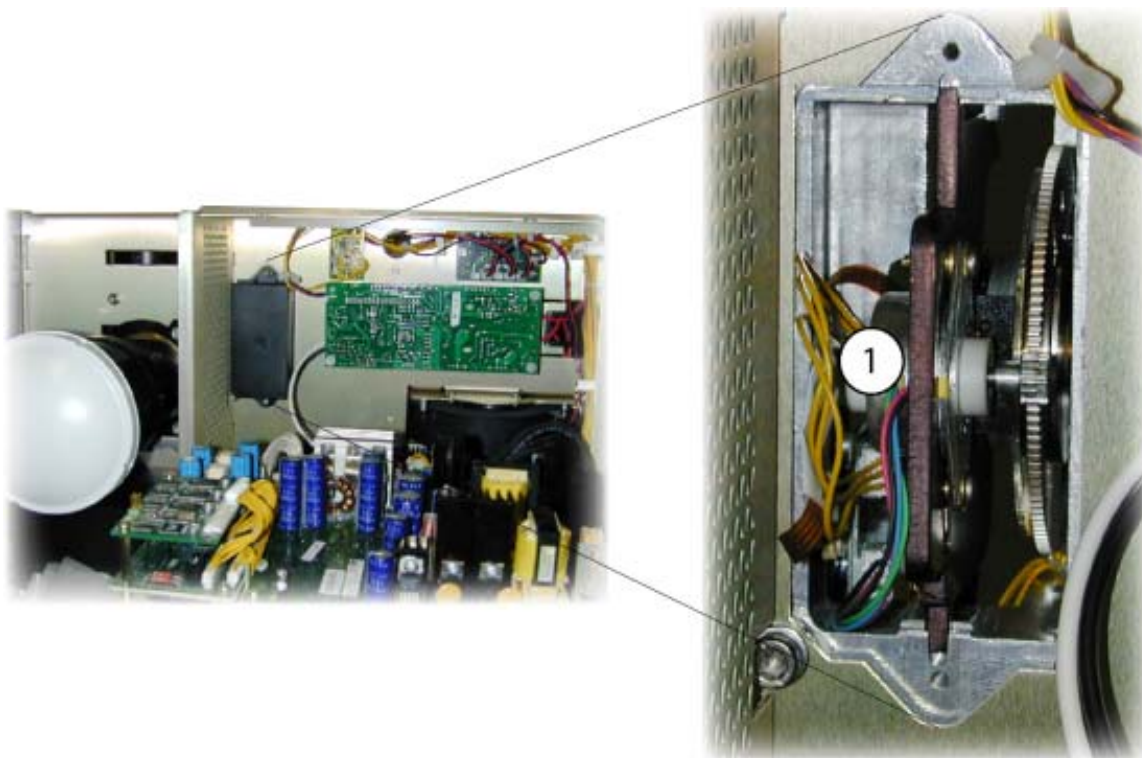


Image 6-6
dimmer motor is located at the front section of the projector, behind the black cover

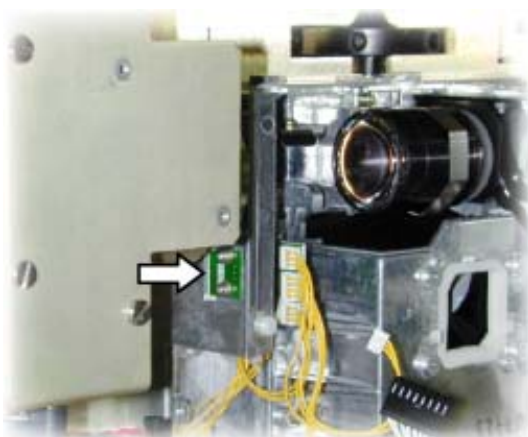


Image 6-7
the dimmer sensor is located at the back section of the projector

6. Component location

Image	Partnumber	Description	
1	B358014K	Dimmer motor	NR
2	R764102K	Dimmer sensor	NR

7. ELECTRONIC SPARES AND SERVICING

Overview

- Power Factor Corrector (PFC)
- Switched Mode Power supply (SMPS)
- Fan control
- The RGB input
- The communication interface board
- The Pixel Map Processor (PMP)
- The formatter
- The Controller (CPU)
- UHP lamp driver
- The Stepper Motor Driver
- Light sensor

7.1 Power Factor Corrector (PFC)

Service sheet



Image 7-1

Part number	Description	
R763943K	Power Factor Corrector	LR

7.1.1 Description

Functional description

The mains voltage is applied to J1 and J2.

The EMC filtering is done by the combination of C1, C2 and L1.

VDR1 is a protection against high voltage spikes that can occur on the mains input while NTC1 limits the inrush current. This resistor is shorted by means of RL1 once the standby supply is running.

The converter circuit is build around the L4981A (I1), Q1, L3 and D12. These components form a typical boost **step-up converter**, which 'converts' the mains input voltage in a DC voltage of about +380VDC and corrects power factor.

This DC output voltage is switched between 2 levels depending on the input voltage, insuring this way a better efficiency at 85 VAC. The detection of the input voltage level happens with I60 pin 10,11and13 and pin 4, 5 and 2.

I60 creates the **Vin_High** signal, this signal is routed to Q40 which switches the level by pulling down the 375VDC to 290VDC.

Another output **Vin_High_1** of this circuit is connected to the SMPS where it is used to detect "undervoltage" The undervoltage protection circuit has been added to prevent that, in case of extreme low mains voltage, some harm is done to the PFC (I60 pin 6,7 and 1 and pin 8,9 and 14) by switching it off.

The output voltage is adjusted with P1.

To check the temperature of the heatsink, a LM35D temperature sensor has been thermally connected to it (I51). The output voltage is amplified 10 times and then converted into a PWM signal **T_PFC** by the second half of I50 to make it possible to transfer the signal to the secondary side of the SMPS.

7.1.2 Connections

Connector overview



Image 7-2

Connector layout

J1 connector layout

Pin	Description	Value
J1	from mains input	mains voltage

J2 connector layout

Pin	Description	Value
J2	from mains input	mains voltage

J3 connector layout

Pin	Description	Value
J3	GNDM	mains ground

J10 connector layout

Pin	Description	Value
1	supply for lamp driver	$I_{nom} = 600mA$
2	-	-
3	GNDM	mains ground
4	GNDM	mains ground

J20 connector layout

Pin	Description	Value
1	supply from PFC	+375VDC
2	-	-
3	GNDM	
4	GNDM	
5	PFC_ON	
6	++15VM	++15VM
7	T_PFC	PWM signal representing the heatsink temperature signal

Pin	Description	Value
8	Vin_HIGH_1	High/Low signal
9	++5VM_ref	

7.1.3 Diagnostics of the PFC

Fuses on the PFC module

The pfc module contains 5 fuses

- 2 at the mains inputs
- 3 at the PFC output

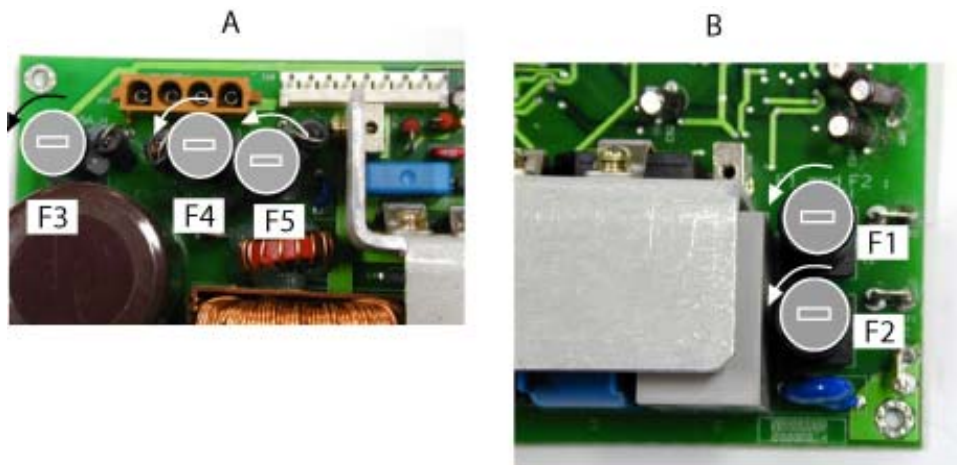


Image 7-3

A lamp driver supply section

B mains supply section

Fuses	Value (A)	Purpose
F1	T4	mains fuse
F2	T4	mains fuse
F3	F3.15	lamp driver protection
F4	—	not used in OverView DR120
F5	T2	380VM line supply of SMPS

Fuse replacement

1. Turn the fuse housing counter clockwise, image 7-3
2. Remove the unscrewed part and remove the fuse from it (image 7-4)



Image 7-4
fuse removed from its housing



WARNING: Always replace with the same type of fuse !

7.1.4 Replacing the PFC

Necessary tools

No tools.

How to remove the PFC ?

1. Open the front panel
2. Slide the PFC board to the right so as to remove it from the projector (image 7-5)

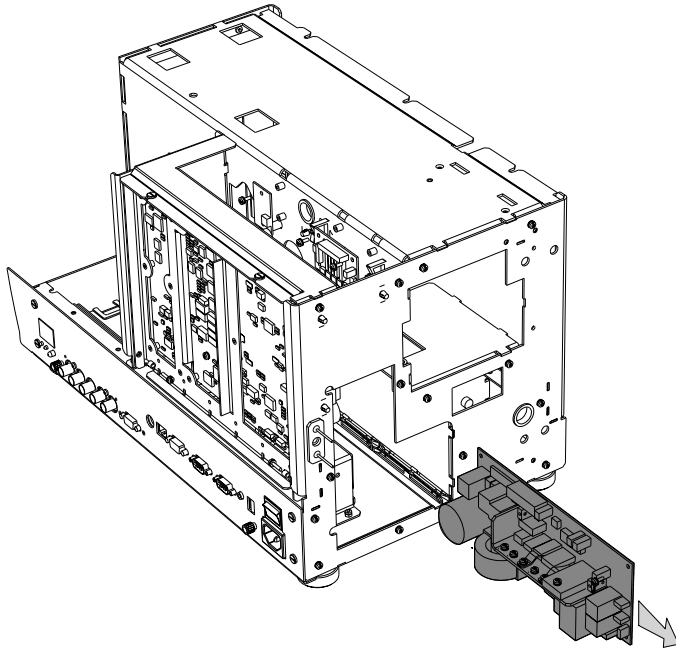


Image 7-5

7.2 Switched Mode Power supply (SMPS)

Overview

- Description of the SMPS
- Diagnostics on SMPS
- Connections

Service sheet

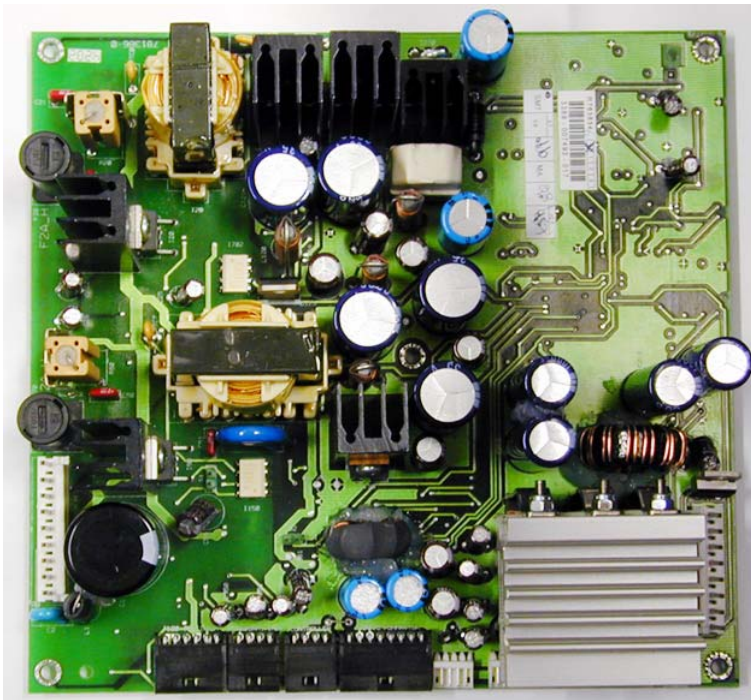


Image 7-6

Part number	Description	
R763834K	SMPS	LR

7.2.1 Description of the SMPS

Functional description

The standby and mains power supplies are built around the TOP240 series of IC's that are fully integrated SMPS controllers and switching devices, here in a flyback configuration.

Both supplies are using secondary feedback to be able to get stable supply voltages ++ 5 and +15,5 V.

Start up

During start-up the standby supply starts first, powering the controller via the ++5V standby supply.

The IC has an internal start up circuit which level is determined by R21, 22 and 23. The converter should start with an input voltage of around 110 VDC present on its "line sense" input, to be sure that the projector always powers up (also when mains is 110Vac).

The PFC can start as soon as the controller asks for it via the **PFC_ON** line.

The **SMPS_ON** line coming from the controller will finally act on the "ext curr limit" input of the second TOP IC I50 via Q50 and that way allow the main SMPS to deliver its power.



The SMPS_ON command from the controller can be bypassed with the S1 switch, forcing the 15.5V
Note that S2 allows to force the PFC ON.



Image 7-7

Standby supply

Built around I20 - T20 and delivers all the standby supplies:

- ++5V :
- - 8V
- ++24V:
- ++15VM: voltage coming from the primary circuit used

The feedback voltage for the standby supply (++5V) is taken on R129 and returned to the primary through optocoupler I120 (1,2,5,6).

Note that the ++5V is adjusted with P1 in the feedback.

On the ++5 V output, an overvoltage protection circuit is added to prevent serious damage in case of a feedback problem (Z125-D125).

Mains supply

The main SMPS is built around I50 - T50, and this converter delivers 15.5 V for the parts that are only powered during operation of the projector.

The feedback voltage for the mains supply is taken on R159 and returned to the primary through optocoupler I150 (3,4,5,6).

For the formatter board a stable 12 V is also required and this one is obtained by using a simple down converter from 15,5 V to 12 V (I270, L270, D270)

To prevent that more windings have to be added to the main transformer to obtain + 5V and - 8 V, the standby voltages ++5V and --8V are switched by means of a MOSFET, using +15,5 V as the command signal. (Q360,361 and Q350).

Voltages monitoring

For the formatter a signal "**Power good**" is required. This signal should be high when all the supply voltages are within the limits (2.5 V, 3.3 V, 5V and 12 V).

To check for this, the voltages are fed to a set of window comparators (I500, 501) checking both under and upper limit of the voltages. The output of the comparators are OR'ed to obtain one single signal **PWR_GOOD**.

The signal 'undervoltage' is combined with 'power good' by means of D501 and D502. The signal **PWR_GOOD_2** is finally brought to the formatter (via the PMP)..



This means that in case of an unexpected situation when there is a voltage drop the DMD mirrors can be parked in a safe way, having sufficient energy built up in the storage capacitors.

All voltages can be checked by means of an ADC to see if the values are within tolerances, and to have a possibility of logging the possible problems. (I600, 601, 602)

These values of DAC's can be read via I²C.

To control the SMPS a PCF 8574 has also been added. This can (again via I²C) switch on the PFC and the SMPS.

The control signals 'temperature PFC', 'undervoltage' and 'power good' can be read.

A very interesting feature of the PCF8574 is the interrupt line (**INT**) that goes low in case of a change of input signal. This can be used to detect a change in one of the signals monitored, however this only lasts for the time the change is present.

The speed with which the IC's are polled is not high enough to be sure that every (short) change on any input will be detected, so an extra flip-flop is added to hold the OR'ed interrupt line (I603) until it can be read by I602. The software can then take appropriate actions, and the flip-flop will be reset.

Undervoltage

To detect a coming voltage drop due to a failure of the mains, or any other cause that switches off the projector, a circuit has been added that checks the **+380VM** line from the PFC (I703). As soon as the output voltage of the PFC drops below a predetermined level, this is detected by the IC and a signal 'undervoltage' is fed to the secondary side via I702.

This level is depending on the output voltage of the PFC which is switched between 290 VDC when the input voltage is between 85 and 140 VAC and 375 VDC with input voltages over 140 VAC.

The circuit responsible for the level setting is set around Q700 which is switched by the **Vin_HIGH_1** signal coming from the PFC, that way R725 is added to influence the voltage levels of the inputs of comparator I703.

Temperature sensing

The PWM signal **T_PFC** generated on the PFC is transferred to the secondary side by means of an optocoupler, where it is integrated by R415/C411 to obtain a DC signal again.

This signal is buffered by I400 and used to control the speed of the fan (**FAN_PFC_CTRL**) for the power

The same signal is also level shifted (I400) and buffered (**OVERTEMP_PFC**) to have it fed to a comparator where overtemperature of the heatsink is detected.

7.2.2 Diagnostics on SMPS

Summary of the generated voltages

Labels	Purpose	
++5V	Controller, Fan ctrl	Standby
- -8V	used internally	
++24V	Fan ctrl	
++15VM	PFC	
+15.5V	RGB input, PMP(Flex4)	Operational
+15VM	PFC	
+12V	Formatter, comms int	
-8V	RGB input	
+5V	PMP, formatter, RGB input	
+2.5V	Formatter	
+3.3V	PMP(Flex4), Formatter	



Refer to the interconnection diagram for more detail about the supply voltages and their use.

LED Diagnostics

The OverView DR120 allows a rapid diagnostics of the main voltages and SMPS diagnostic signals via a number of LED's located at the front side of the projector (on the SMPS) so as to allow rapid checking.



Image 7-8

Voltage diagnostics

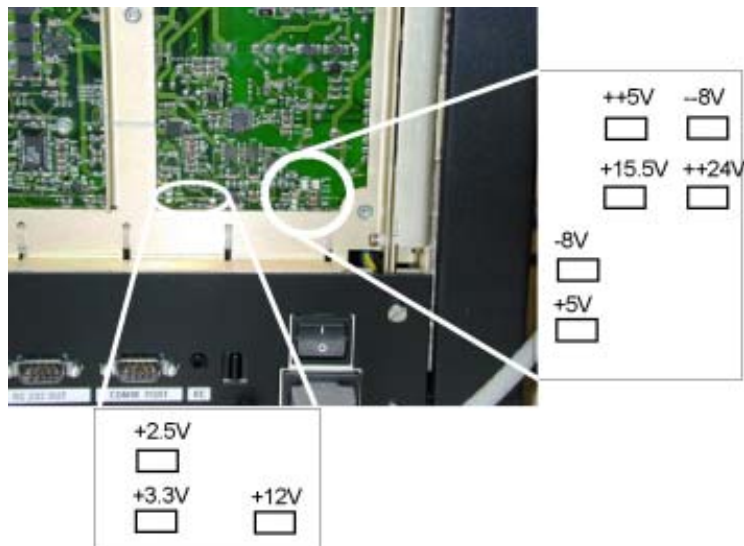


Image 7-9
Voltage diagnostics on projector

7.2.3 Connections

Connector overview



Image 7-10



Image 7-11

Connector layout

J1 : to/from PFC

Pin	Name	Value
1	+380V	250mA@365V
2	N.C.	
3	GNDM	
4	GNDM	
5	PFC_ON	Goes high to enable the PFC
6	++15VM	
7	T_PFC	PWM signal representing the t° of the PFC heatsink
8	Vin_High	
9	++5VM_ref	

J100: to Formatter

Pin	Name	Value
1	+5V	220 mA
2	+3.3V	190 mA
3	+2.5V	920 mA
4	+2.5V	975 mA
5	2.5V sense	feedback from Formatter
6	GND	
7	GND	
8	+12V	220 mA

J110: to communication interface

Pin	Name	Value
1	++5V	
2	+12V	
3	++24V	
4	GND	

J120: to RGB input

Pin	Name	Value
1	+5V	155mA
2	GND	
3	+15.5V	210mA
4	-8V	220mA
5	GND	
6	GND	

J150: to PMP

Pin	Name	Value
1	PWR_GOOD_2	voltage monitoring for Formatter
2	GND	
3	Lamp Enable	lamp ctrl signal from formatter active = high
4	Lamp Litz	feedback from LPS active = low

J151: to lamp driver

Pin	Description	Value
1	Lamp enable	lamp ctrl signal from formatter active = high
2	GND	
3	Lamp litz	feedback from LPS low = lamp lit

J200: to PMP

Pin	Description	Value
1	+3.3V sense	feedback from PMP for stabilization
2	+3.3V	4.8A
3	+3.3V	4.4A
4	GND	
5	GND	
6	+5V	20mA

Pin	Description	Value
7	+15.5V	40mA
8	-8V	

J400: to fan control

Pin	Description	Value
1	++24V	450mA
2	++5V	310mA
3	GND	
4	SDA_STDBY	
5	SCL_STDBY	
6	+12V	75mA
7	Fan_PFC_ctrl	ctrl signal for the PFC fan
8	-	
9	-	
10	GND	
11	GND	
12	INT	

J460: to controller

Pin	Description	Value
1	SDA_STDBY	
2	SCL_STDBY	
3	GND	
4	++5V	560mA

J700: 24 input

Pin	Description	Value
1	+ 24V	
2	- 24V	

7.3 Fan control

Service sheet

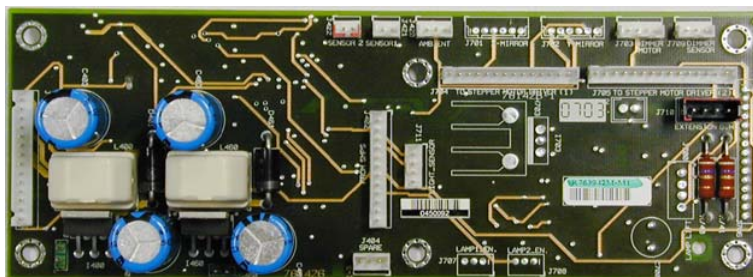


Image 7-12

7. Electronic spares and servicing

Part number	Description	
R763942K	Fan ctrl	LR



The fan control module kit is delivered along with the fan connector module

7.3.1 Connections

Connector overview

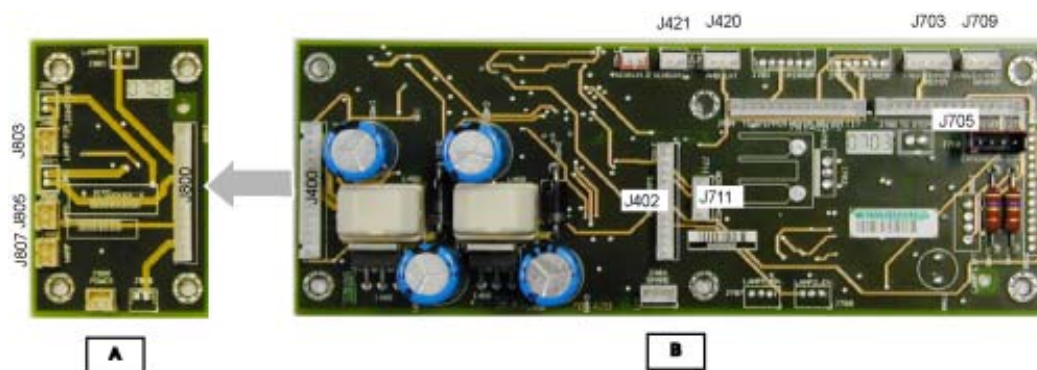


Image 7-13

- A fan connector module
B fan control module

Connector layout

J400/J800 : to/from fan connection board

Pin	Description	value
1	fan_supply_1 (Power fan)	
2	fan_fail_1	
3	-	
4	-	
5	-	
6	fan_supply_2 (lamp1,lamp top, Warp)	
7	+12V	
8	fan_fail_2	
9	GND	
10	GND	
11	-	
12	-	
13	-	
14	-	

J402: to/from SMPS

Pin	Description	Value
1	++24V	
2	++5V	
3	GND	
4	SDA_STBY	
5	SCL_STDBY	
6	+12V	
7	Fan_PFC_ctrl	
8	-	
9	-	
10	GND	
11	GND	
12	INT	

J420: from ambient sensor

Pin	Description	Value
1	Supply	+10V
2	Ambient temp	
3	GND	

J421: from lamp sensor

Pin	Description	Value
1	Sensor switch pin	High in normal condition Low in case lamp overtemperature
2	GND	

J703: to dimmer (via interconnection unit)

Pin	Description	Value
1	M3 phase 1	
2	M3 phase 1	
3	M3 phase 2	
4	M3 phase 2	

J705: from stepper motor driver

Pin	Description	Value
1	SCL_STBY	
2	SDA_STBY	
3	GND	
4	++5V	
5	++5V	

Pin	Description	Value
6	+12V	
7	GND	
8	GND	
9	-	
10	M3 phase 1	
11	M3 phase 1	
12	M3 phase 2	
13	M3 phase 2	
14	REF 3	Position feedback pulses from dimmer
15	GND	

J709: from dimmer sensor (via interconnexion unit)

Pin	Description	Value
1	++5V	
2	REF3	Position feedback pulses from dimmer
3	GND	

J711: from light sensor

Pin	Description	Value
1	++5V	
2	SCL_STBY	
3	SDA_STBY	
4	GND	

J803: to lamp top fan

Pin	Description	Value
1	Fan_supply_2	
2	Fan_fail_2	

J805: to lamp fan

Pin	Description	Value
1	Fan_supply_2	
2	Fan_fail_2	

J806: to pfc(power) fan

Pin	Description	Value
1	Fan_supply_1	
2	Fan_fail_1	

J807: to Warp fan

Pin	Description	Value
1	Fan_supply_2	
2	Fan_fail_2	

7.4 The RGB input

Description

Partnumber	Description	
R763284K	RGB input	FR

How to replace the RGB input ?

1. Remove the 5 screws on the front panel (image 7-14)
2. Disconnect the power supply cables (green wires) and the I²C cable connector (yellow wires) (image 7-15)
3. Disconnect the 5 mini coax cables (image 7-16)
4. Loosen the 3 front screws A (image 7-17)
5. Loosen and remove the board screws
6. Remove the board

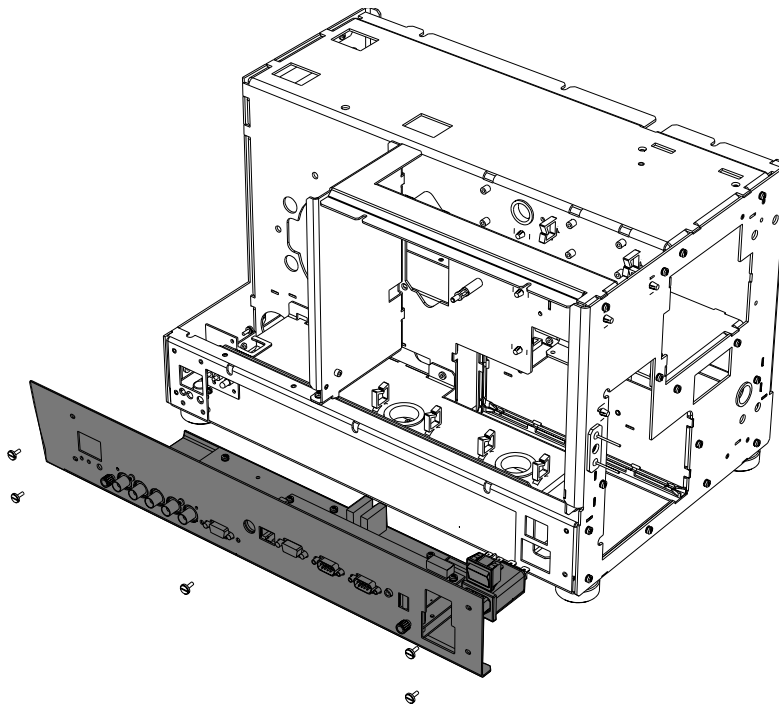


Image 7-14



Image 7-15
RGB power and I²C connections



Image 7-16
RGB input coax cables

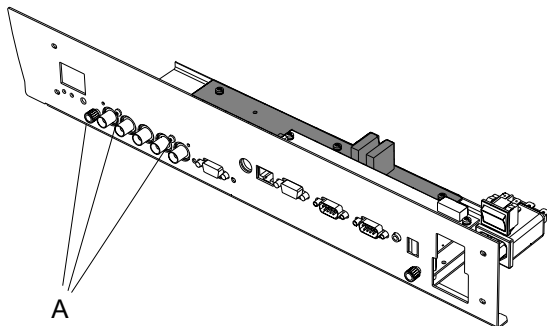


Image 7-17

7.5 The communication interface board

Description

Partnumber	Description	
R763522K	Interface version 3	NR

Replacing the communication interface board

1. Remove the front section, refer to the RGB input removal procedure.
2. Disconnect the power cable (green wires), the data flat cable (see connector instructions for more info on how to remove flat cable connectors of type 1) and the display connection cable (yellow wires) (image 7-18)
3. Loosen the 4 screws (image 7-19)

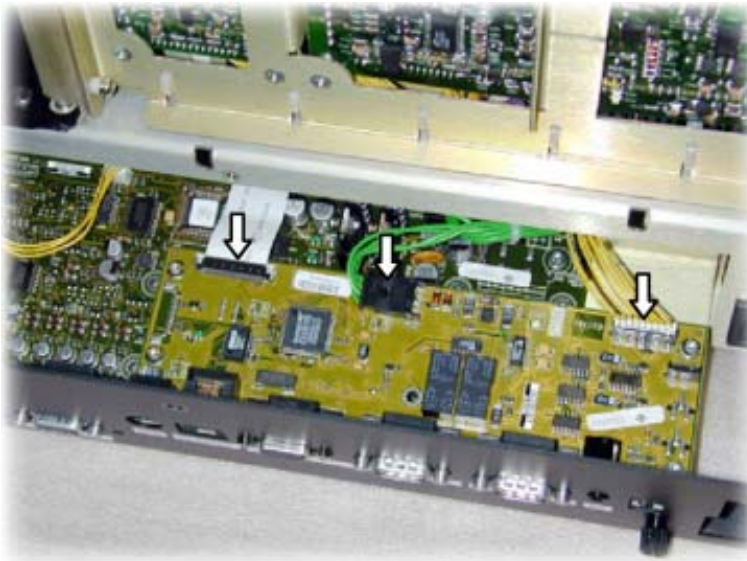


Image 7-18
comm's interface connections

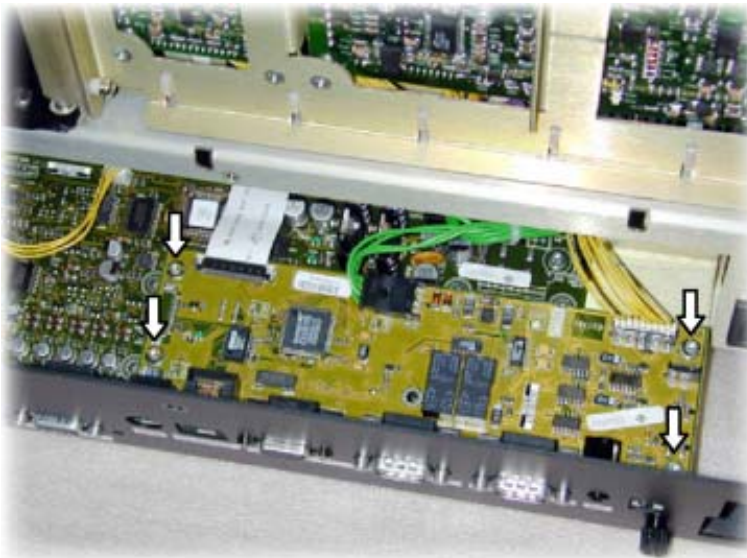


Image 7-19

7.6 The Pixel Map Processor (PMP)

Description

Partnumber	Description	
R764108K	Pixel Map Processor (PMP)	FR
R763925K	Conhead FB PMP	NR

How to replace the PMP ?

1. Disconnect the 2 flat cables (to/from controller), the control signal cable and the mini coax cables. (image 7-20)
2. Loosen and remove the screws
3. Remove carefully the PMP

Caution: The PMP is connected to the formatter and to the SMPS using a board to board connector, when removing the PMP be careful not to damage the board to board connection !

(image 7-21)

7. Electronic spares and servicing

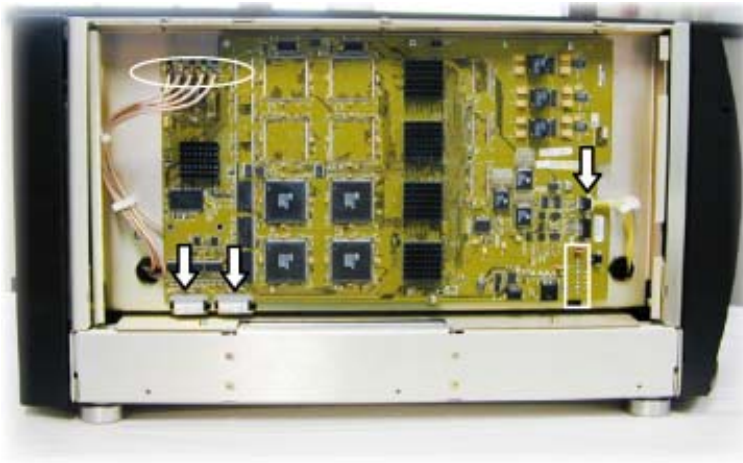


Image 7-20
PMP connections

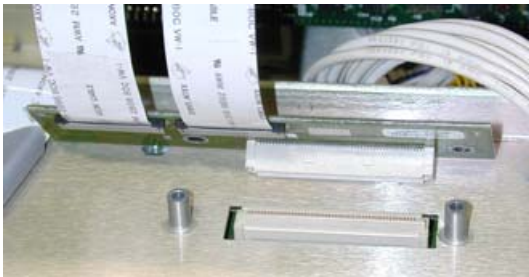


Image 7-21
board to board (to formatter) connector removed

7.7 The formatter

Service sheet

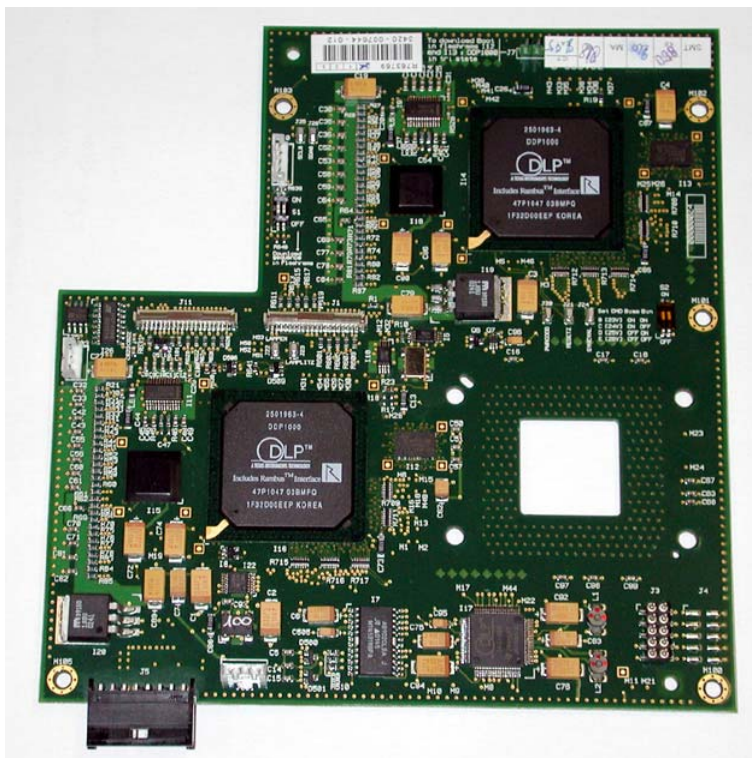


Image 7-22

Partnumber	Description	
R763769K	Formatter (without DLP chip)	FR

7.7.1 Description of the formatter



White peaking (WP)

The white segment interval of the color wheel is used for brightness/contrast ratio enhancement, therefore the lamp and the DMD must be synchronized to the color wheel in order to temporarily “peak” the lamp’s drive signal during the white interval, this is called **White peaking**.

Description

The formatter board is a digital image processing unit where the image data is 100% digital from the input port to the image projected on the display screen.

Digital input is accepted from the 30-bit RGB image input port up to the native DMD resolution. .

The formatter performs 2 main tasks:

- Image processing : The formatter processes the digital input and converts the data into a bit plane output format to drive the DMD image bus and provides:
 - de-gamma
 - white peaking
 - color space conversion,
 - contrast and brightness image adjustments
 - color coordinate adjustment allowing independent adjustment of primary and secondary colors and white point
- System level control: color wheel and lamp are “synchronized” with the data processing process.

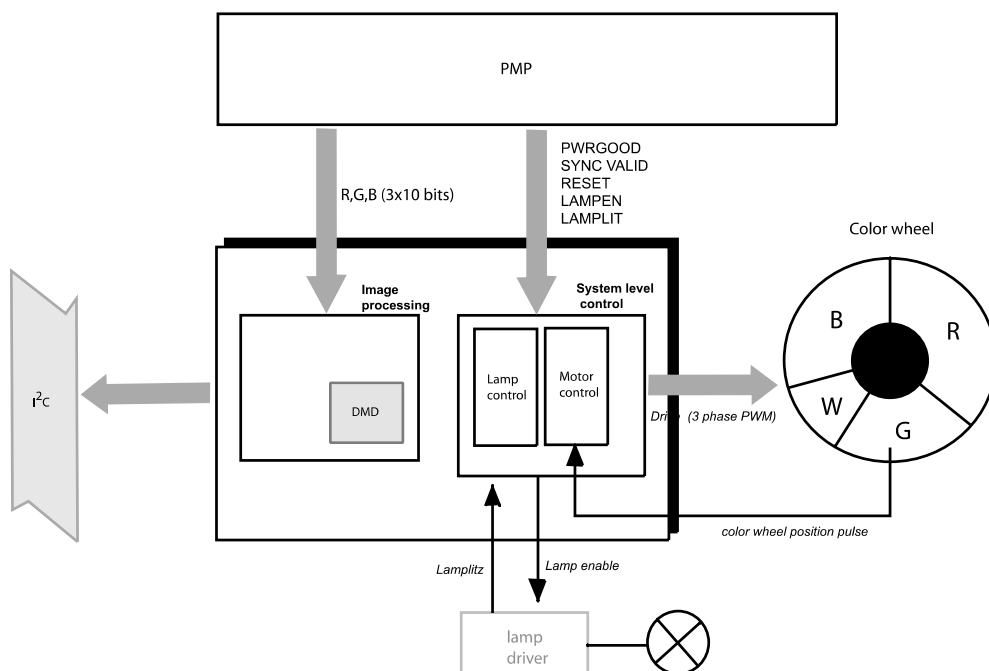


Image 7-23

Lamp control and feedback

To achieve the best color reproduction, the lamp has to be synchronized with the color wheel.

This is done in permanent mode (once the lamp is started up) via the switching of the **Lamp enable** line each time the white segment passes in front of the CW sensor, White peaking (WP) is then achieved by boosting the lamp supply during that short interval.

Following graphic show a vertical refresh rate of 50Hz, this implies a color wheel frequency of 150 Hz ($3 \times V_{freq}$), the white segment passes thus 3 times per frame.

Each time the white segment passes in front of the sensor **Lamp enable** is switched and the lamp supply is boosted.

The **Lamp Litz** line, being the feedback signal from the lamp driver, is also modulated in permanent mode to achieve the best lamp management. This is done by modulating the number of pulses of the Lamp Litz line in function of the ratio of the plateau amplitude (P) to the pulse amplitude (B) of the lamp drive signal since this ratio gives an image of the lamp age.

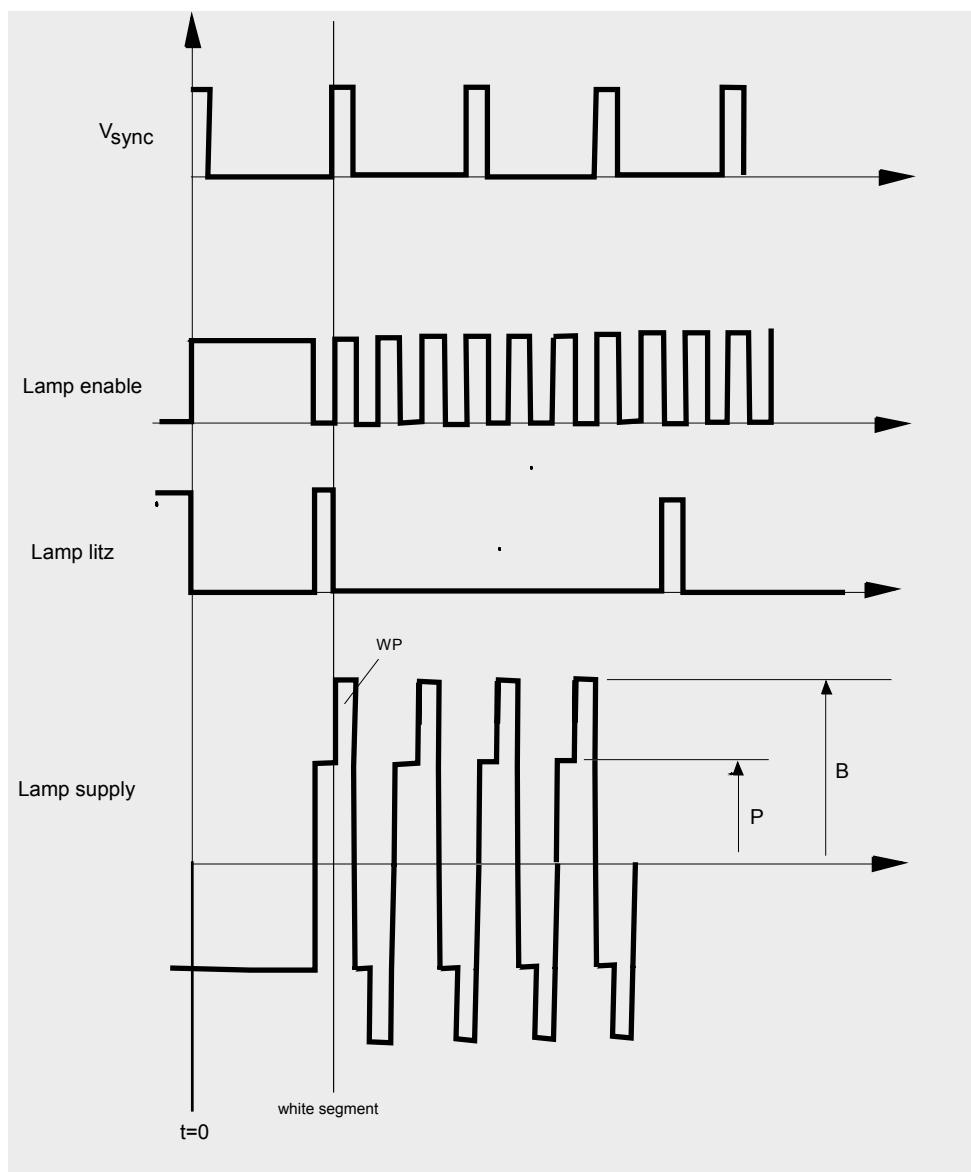


Image 7-24

P Plateau

B Pulse amplitude

7.7.2 Diagnostics of the formatter

Measuring points

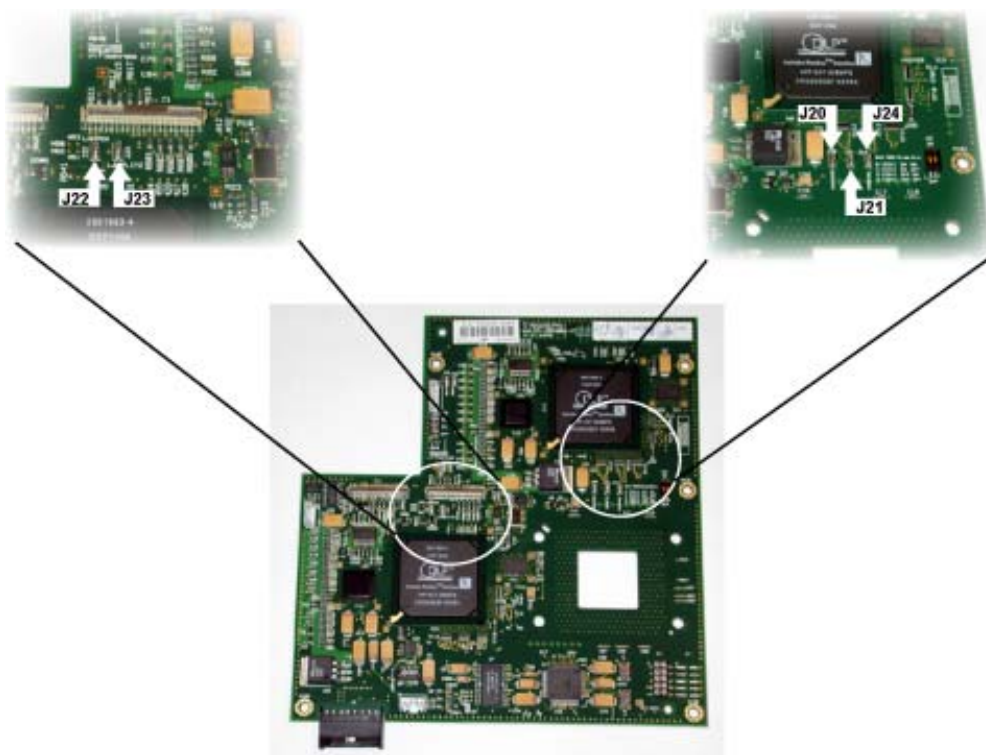


Image 7-25

Measuring point	Name	Description
J20	PWRGOOD	Normally high. power good, Indicates the presence of the different voltages on SMPS. see "Diagnostics on SMPS", page 33
J21	RESETZ	Normally high.
J22	LAMPEN	Normally high. Lamp enable signal, switched in permanent mode for white peaking (during white segment interval)
J23	LAMPLITZ	Normally low. Lamp lit feedback signal, switched in permanent mode for white peaking lamp age compensation.
J24	SYNCVAL	Normally high. Sync valid, indicates a valid sync signal at the RGB input

7.7.3 Connections

Connection overview

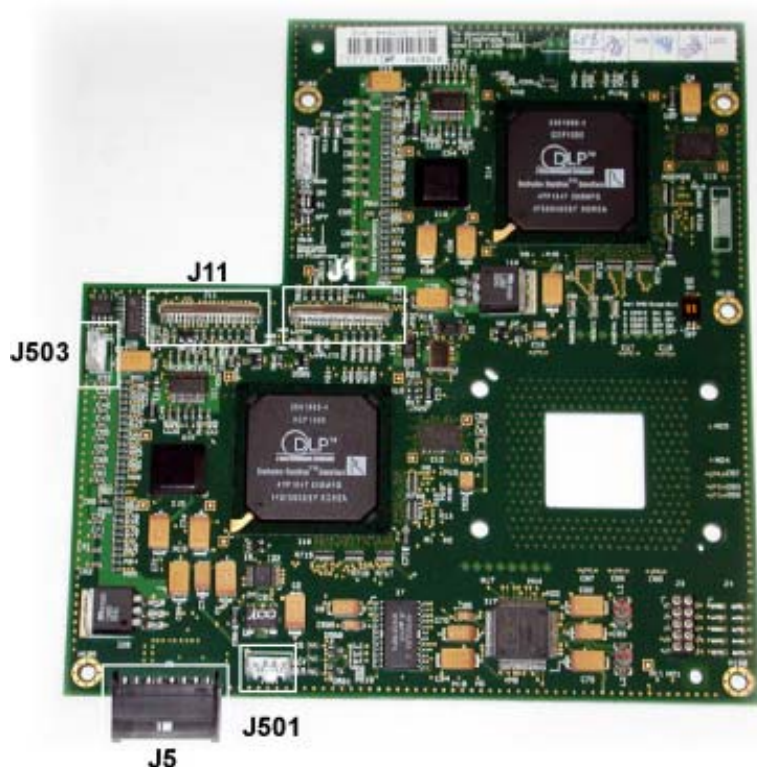


Image 7-26

J1: flat cable connector from PMP (via PMP connector unit)

Pin	Description	Value
1...40	Green, Red image data	2x10 bit

J11: flat cable connector from PMP via PMP connector unit

Pin	Description	Value
1...21	Blue image data	10 bit
22	POWERGOOD	active = high is high when all the voltages are present (SMPS)
23	RESETZ	active = low
24,25	SCL,SDA	I ² C bus
28	LAMPEN	active = high enable signal for the lamp
29	LAMPLITZ	active = low feedback signal from the lamp
34	SYNCVAL	sync valid signal active = high

J5: from SMPS

Pin	Description	Value
1	+5VA	
2	+3.3VA	
3	+2.5VA	
4	+2.5VA	
5	+2.5V_SENSE	feedback signal to SMPS for stabilization of 2.5V
6	GND	
7	GND	
8	+12VA	

J503: to/from color wheel sensor via interconnection unit

Pin	Description	Value
1	+5V	+5V for LED color wheel
2	CWI	Color Wheel Index puls
3	GND	Ground

J501: to color wheel motor via interconnecton unit

Pin	Description	Value
1	OUT C	phase C motor Color Wheel
2	OUT A	phase A motor Color Wheel
3	OUT B	phase B motor Color Wheel
4	CENTER	centertap motor Color Wheel

7.7.4 Interconnection unit

Description

The interconnection unit links the formatter to the various peripherals.

For the location of the unit , image 8-9

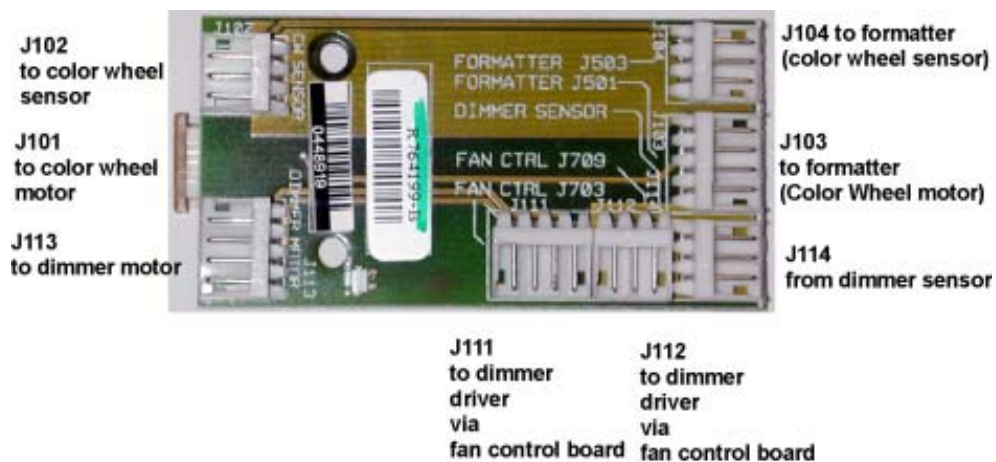


Image 7-27

7.7.5 Replacing the formatter



CAUTION: When replacing the formatter board or DLP chip, always check the DMD bias switch on the board !
Never power up the projector with inadequate settings !

How to remove the formatter board ?

1. Open the backside panel
2. Remove the 2 flat cables (image 7-28)
Tip: refer to the General information chapter for connector guidelines
3. Remove the heatsink by removing the 2 screws (image 7-29)
4. Unscrew the 2 bottom screws retaining the hole mechanical assembly (image 7-30)
Tip: for more info about the assembly, image 9-24
5. Remove the 2 top screws, while retaining the assembly to prevent it from falling. (image 7-31)
See image 7-32.
6. Remove all the mechanical parts
Leave the DLP chip and sustain it by retaining the formatter board against the projector frame so as to prevent the DLP chip from falling. (image 7-33)
7. Pass your finger through the hole to prevent the DLP chip from falling and remove the formatter board. (image 7-34)
8. Remove the DLP chip (placed in the DLP interposer)
See image 7-35.

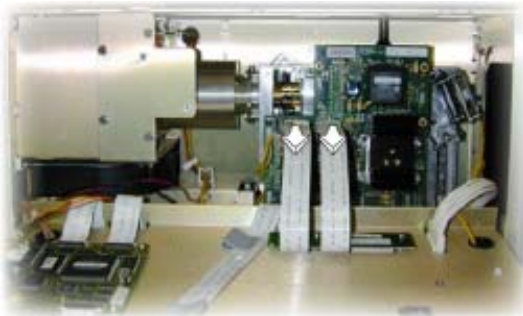


Image 7-28



Image 7-29



Image 7-30

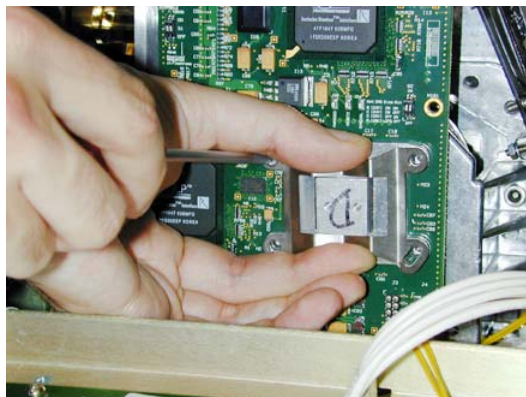


Image 7-31



Image 7-32
mechanical assembly removed

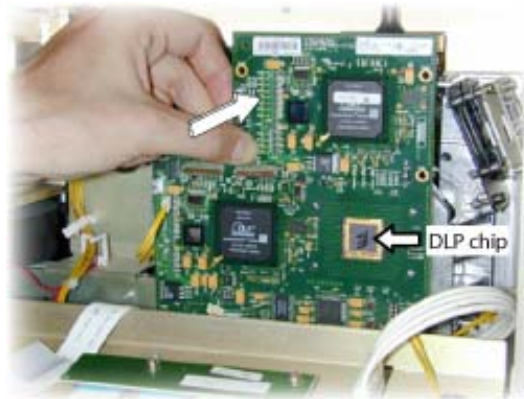


Image 7-33

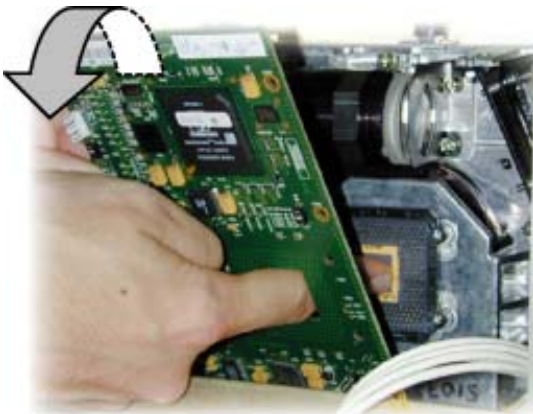


Image 7-34

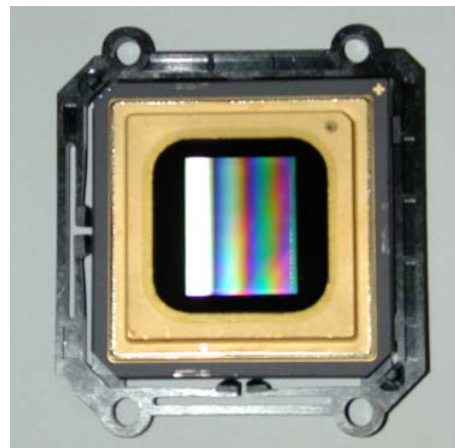


Image 7-35



CAUTION: The removed DLP chip and its accessories have to be handled with caution and placed in a safe place



CAUTION: Never touch the gold contacts on the chip, on the interposer or on the formatter ! Fingerprints may damage the chip.

DMD bias setting

The DMD chip used in the projector has to be matched to the formatter in order to allow the right biasing of the chip.

Therefore a switch S2 is provided on the formatter board, this switch has to be positionned depending on the type of DMD.

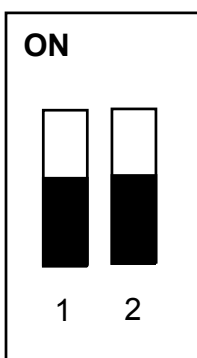


Image 7-36
S2 switch

Place the switch in the adequate position depending on the type of DLP chip (see formatter screening).

DMD type	bias	switch 1 (left) position	switch 2 (right) position
B	23V	ON	ON
C	24V	ON	OFF
D	25V	OFF	ON
E	26V	OFF	OFF

7.8 The Controller (CPU)

Description

Partnumber	Description	
R7633996K	CPU	FR

How to Replace the CPU ?

1. Remove the 3 flat cables, the power and I²C connector (image 7-37)
2. Loosen and remove the 4 screws (image 7-38)
3. Place the news CPU, connect and fix it as described here

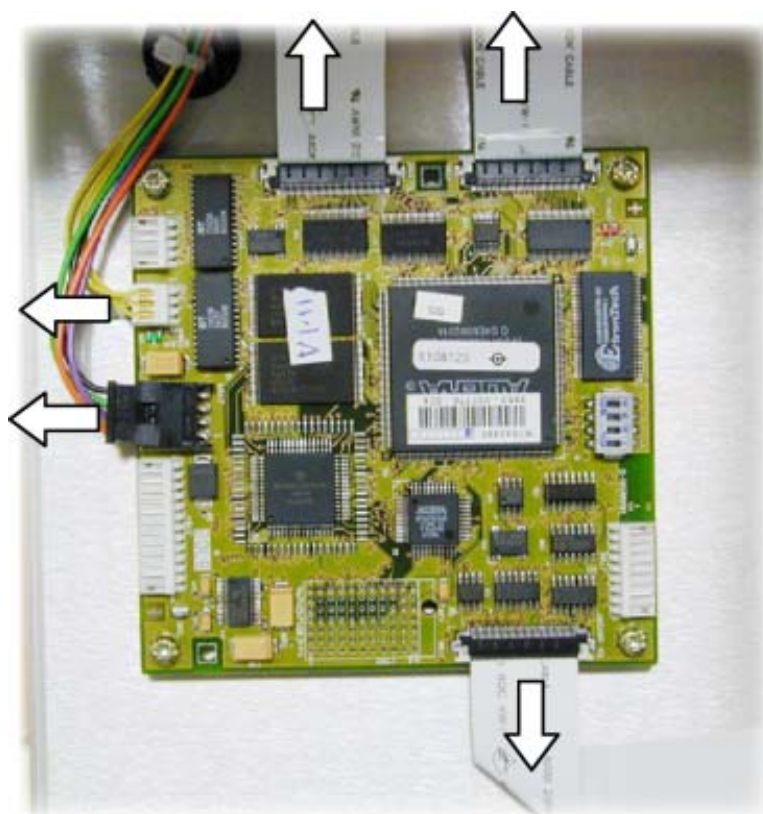


Image 7-37

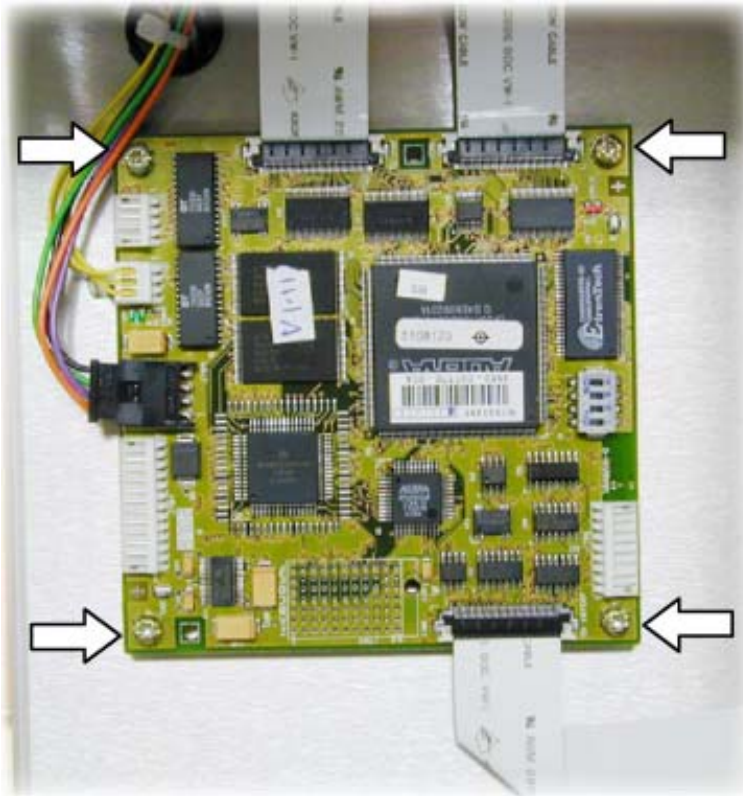


Image 7-38



CAUTION: When replacing the CPU, the projector settings should be reloaded, contact Barco to get these settings.

7.9 UHP lamp driver

Service sheet

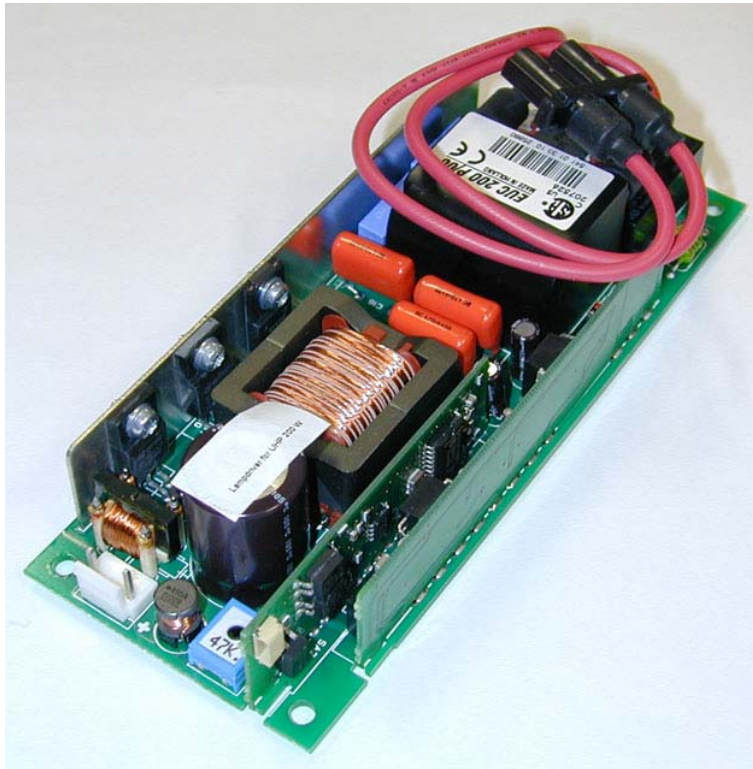


Image 7-39

Description

The lamp driver is connected to the PFC with a 4 pin power connector which delivers the +365VDC supply voltage (2 wires) for the lamp driver.

The control signal **Lamp_enable** comes from the formatter (via the SMPS), on its turn the driver generates a feedback signal **Lamp_Litz** for the formatter.

For more detail about these signals see the formatter section.

Partnumber	Description	
B400520K	LPS driver	FR

Replacing the Lamp driver

1. Open the front panel
2. Unscrew the 4 synthetic nuts (image 7-40)
3. Disconnect the driver at the lamp and at the PFC (image 7-41)
4. Remove the Lamp driver



Image 7-40



Image 7-41
LPS connections



7.10 The Stepper Motor Driver

Description

Partnumber	Description	
B557933K	LPS driver	NR



For more info about the stepper motor driver, "Dimmer Motor and Sensor", page 60

How to replace the stepper motor driver ?

1. Disconnect both connections on the board (image 7-42)
Note: Note that connection A is not necessary for the OverView DR120 i.e. if this connection is not made this will not influence the good operation of the projector.
2. Loosen and remove the 3 screws
3. Remove the board



Image 7-42
Stepper motor driver connections and screws

7.11 Light sensor

Service sheet

7.11.1 Description

Function of the light sensor

In the OverView DR120, the light sensor is located behind the folding mirror that reflects light coming from the light-pipe towards the TIR-prism. The sensor sees an amount of light proportional to the amount of light coming from the lamp. It returns an ON-OFF signal with a frequency proportional to the amount of light.

7.11.2 Replacing the light sensor

Necessary tools

Torx (10)

How to remove the light sensor ?

1. Loosen the screws and remove the grid (2 top screws), the handle (3x M4 bottom screws) and the metallic frame (4 screws). (image 7-43)
2. Loosen the 2 screws (image 7-44)
3. Remove the board

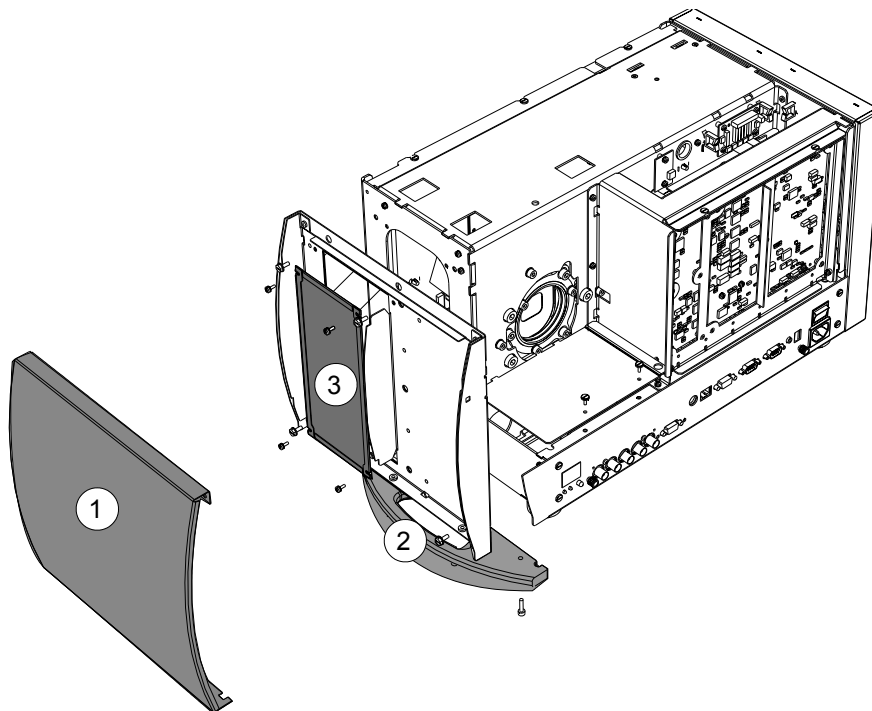


Image 7-43
 1 grid plate
 2 handle
 3 metallic frame

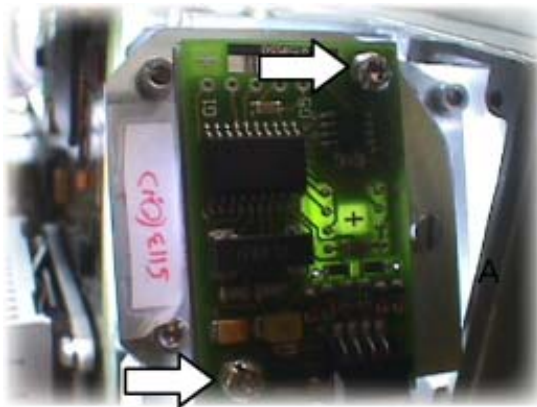


Image 7-44

7.11.3 Light sensor calibration

Objective

Calibration of the light sensor is necessary for 'Constant Light Output' (CLO) feature on the OverView DR120.

To calibrate the light sensor, the Optical Calibration software is used.

Refer to the software chapter for setup.

The button LIGHT SENSOR opens the window shown, we will explain how to use this window to calibrate the sensor

Necessary tools

- light meter
- optical calibration software

How to calibrate the light sensor ?

1. Press the **Light sensor** tab button

See image 7-45.

2. It is necessary to initialize the sensor before starting the calibration procedure. Pressing the **INITIALIZE** button will do this.

When this is done, the *PULSE COUNTER* field in the *PROJECTOR CONTROL* sub-window will be filled in.

This value that appears corresponds to the frequency the sensor generates due to the light flux it receives

3. As the projector will be operated mostly at a regime of 800-1400 lm, we will do the calibration of the sensor at 1100 lm. It is however likely that the screen lumens are higher than this value, when the internal pattern is generated. By using the *DIMMER POS* field, we can turn the dimming wheel and lower the light throughput. This value, which can be altered by pressing the arrow buttons, needs to be adjusted until an ANSI Light Output of 1100±3% lumen is reached.

While adjusting the dimmer position, the value in the *PULSE COUNTER* field will change accordingly.

4. Finally, when the dimmer position is adjusted in such a way that the requirement is fulfilled, the sensor can be calibrated. To do this, enter the measured ANSI Light Output in the *LUMENS* field in the *CALIBRATION PARAMETERS* sub-window

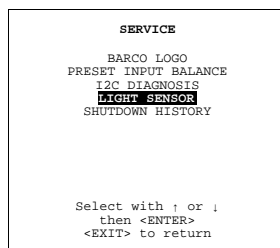
5. In addition, copy the *PULSE COUNTER* field into the *# PULSES* field.

6. to send this information to the projector, press the *UPLOAD* button.

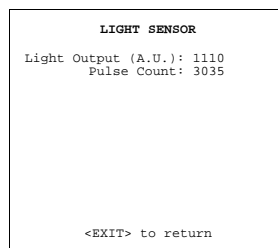
7. Exit the software.

8. The correct operation of the sensor can now be checked with the projector menu. Go to *SERVICE*, and select and enter *LIGHT SENSOR*. (menu 7-1)

On top of your background image, a window as shown in the inserted screenshot will appear. In this window, the counted number of pulses and the calibrated light output is shown. (menu 7-2)



Menu 7-1



Menu 7-2



Image 7-45



Notice the (A.U.) written beside Light Output.

This is necessary because white peaking has no impact on the light sensor performance, despite its huge influence on the screen lumens (white peaking “happens” on the DMD after the light has passed the folding mirror).

This means that a measured light output of 1021 can correspond to only 650 screen lumens (when white peaking = 0), but also to 1020 screen lumens (when white peaking = 10).

This was the reason for the use of an internal pattern with white peaking equal to 10. If the values seen on the screen are realistic taking the only just preformed calibration in mind, the calibration was successful.

8. MECHANICAL SPARES AND SERVICING

8.1 Dustfilter

Description

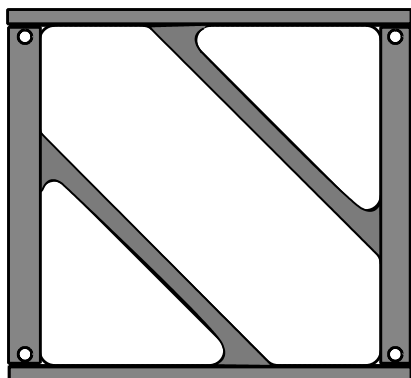


Image 8-1

Partnumber	Description	
R825179K	Filter assembly	CO

8.1.1 Replacing/Cleaning the Dustfilter

Necessary tools

- flat screwdriver
- new filter or cleaning cloth

How to remove the filter ?

1. Take out the 2 screws on top
2. Release the grid from under the top cabinet (image 8-2)
3. Take out the dustfilter by holding the grid under an angle
4. Clean the removed filter using a dry cloth or place the new filter.

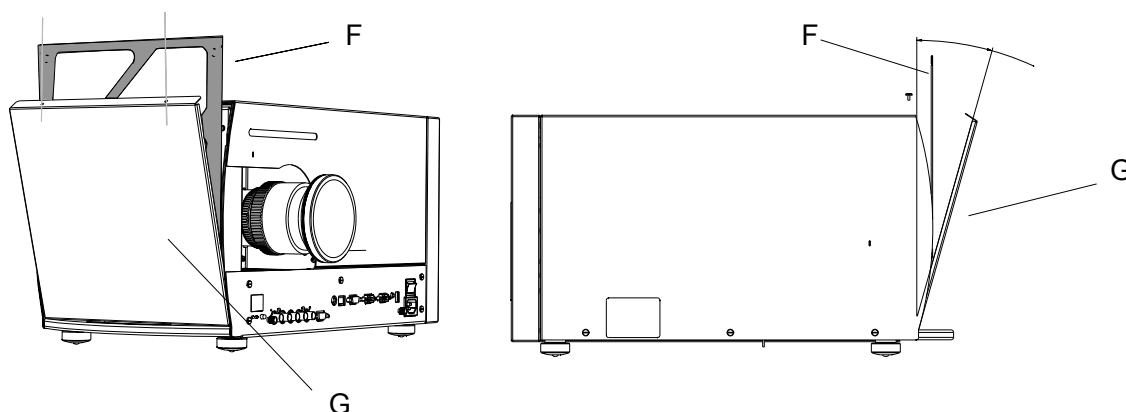


Image 8-2
F filter
G grid

8.2 Top housing

Description

Partnumber	Description	
B825140K	Top housing	NR

How to remove the top housing ?

1. Open side door
2. Loosen 3 screws on backside (A)
3. Loosen top screws of input tray
4. Shift top cabinet against door (image 8-3)
5. Lift and remove the cabinet upwards

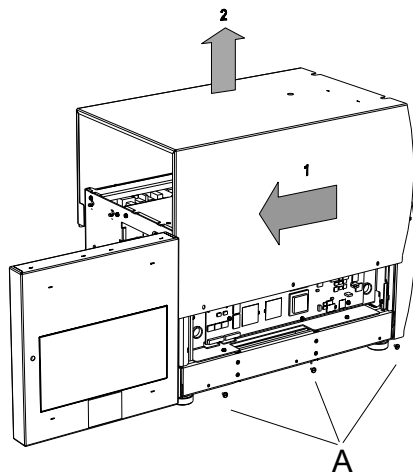


Image 8-3

8.3 Dimmer Motor and Sensor

Description

Partnumber	Description	
B358014K	Dimmer motor	NR
R764102K	Dimmer sensor	NR

The dimmer motor is used to dim the light output of the projector. It is placed just before the color wheel.

It consists of a bipolar 2 phase stepping motor fully controlled by the stepper motor driver board with its onboard 8 bit microcontroller.

Feedback from the motor is achieved through an optical sensor mounted on the mechanical frame.

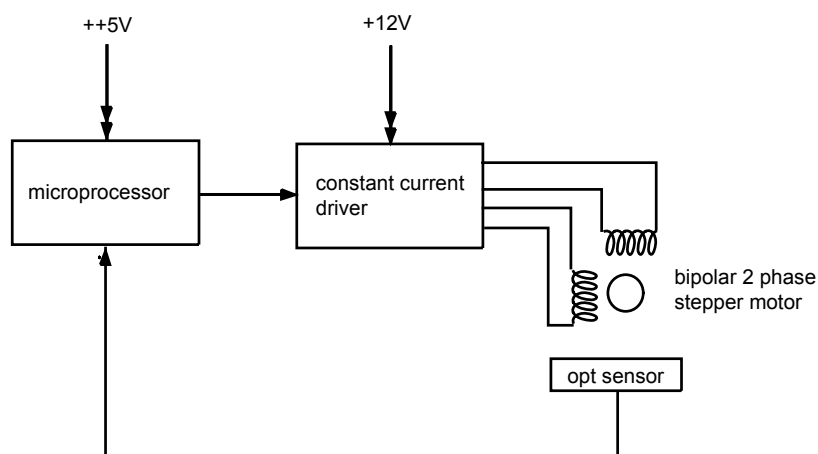


Image 8-4

How does the dimming and sensing work ?

The dimmer motor actions the dimming plate so as to place it in the required position, depending on this position more or less light may pass through the profile and enter the lightpipe.

The angular position of the plate is taken when the black dot passes in front of the sensor, hereby preventing the reflection of the emitted signal (the rest of plate surface is made of reflective material).

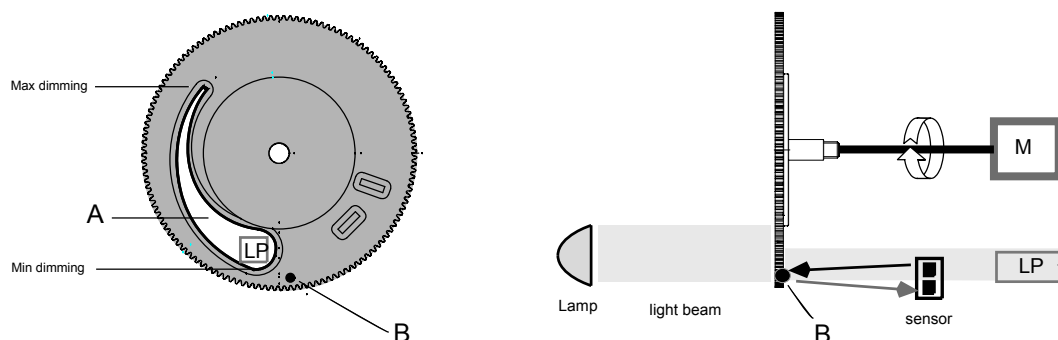


Image 8-5

How to replace the Dimmer motor ?

1. Remove the front panel
2. Remove the black cover by loosening the 2 screws (image 8-6)
See image 8-7.
3. Remove the dimmer and color wheel plate (image 8-8)
4. Remove the motor connector (4 wires, black/red/green/blue) and the Color wheel sensor connector (3 yellow wires) on the inter-connection unit (image 8-9)
5. Disconnect gently the flat cable.
6. Loosen the 2 screws of the motor
7. Replace the motor

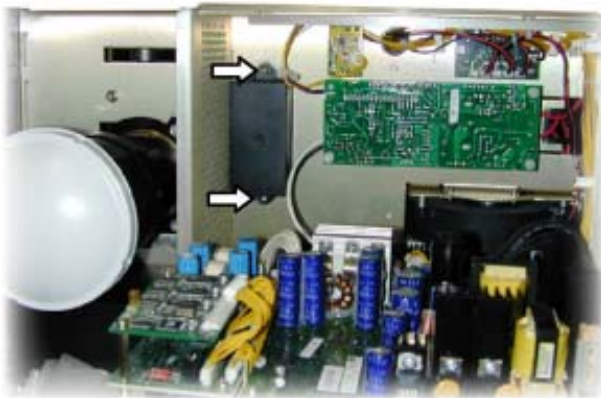


Image 8-6
black cover screws

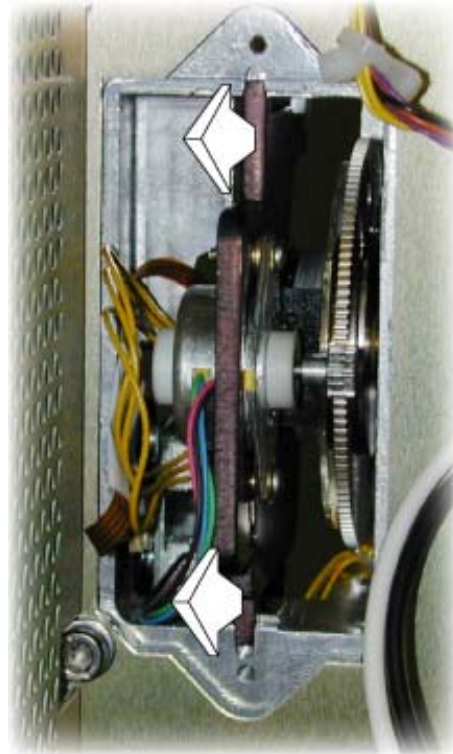


Image 8-7

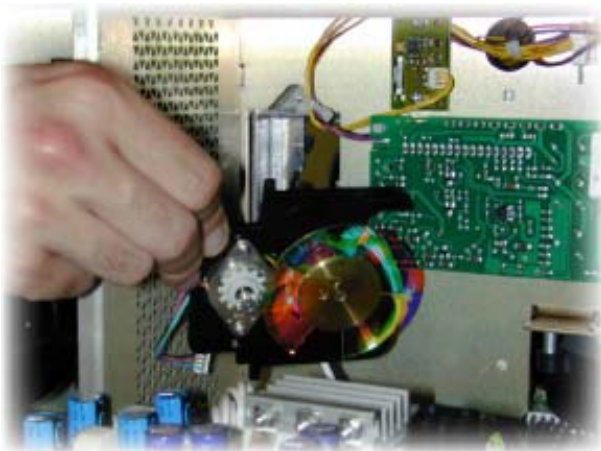


Image 8-8



Image 8-9
location of the interconnection unit

- A interconnection unit
B flat cable for the color wheel motor control

Replacing the dimmer sensor

1. Loosen and remove the 2 screws

8.4 Fans

8.4.1 Replacing the Power Fan

Fan interconnection unit

All the fans are connected to the fan control unit via the fan interconnection unit i.e. they have to be disconnected from this interconnection unit when replacing them.

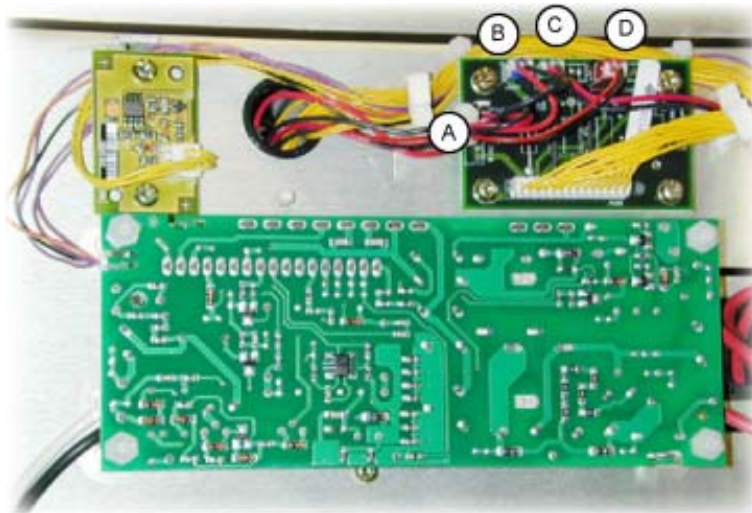


Image 8-10
Fan interconnection unit view

- A To Warp fan
- B To PFC power fan
- C To lamp fan
- D To lamp top fan



When needed, remove cable straps to easily disconnect a connector, when finished always replace with new cable straps and tie up the cables to their initial position.

How to replace the power fan ?

1. Disconnect the fan from the fan interconnection unit
2. Loosen and remove the 4 screws S (image 8-11)
3. Remove the fixation rubbers and plate
4. Remove the fan
5. Remove the fan wire

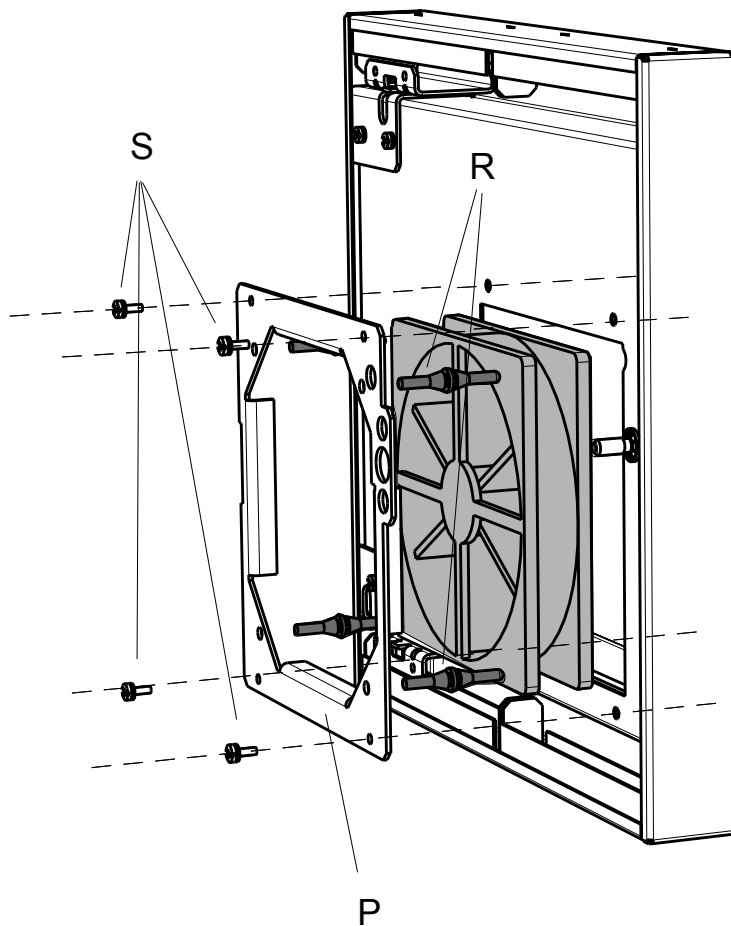


Image 8-11
Power fan removal

R fixation rubbers
P fixation plate
S fixation screws

8.4.2 Replacing the big lamp fan

How to replace the big lamp fan ?

1. Loosen the 4 screws and remove the fixation plate (image 8-12)
2. Remove the fan assembly
3. Remove the screws to remove the fan (image 8-13)

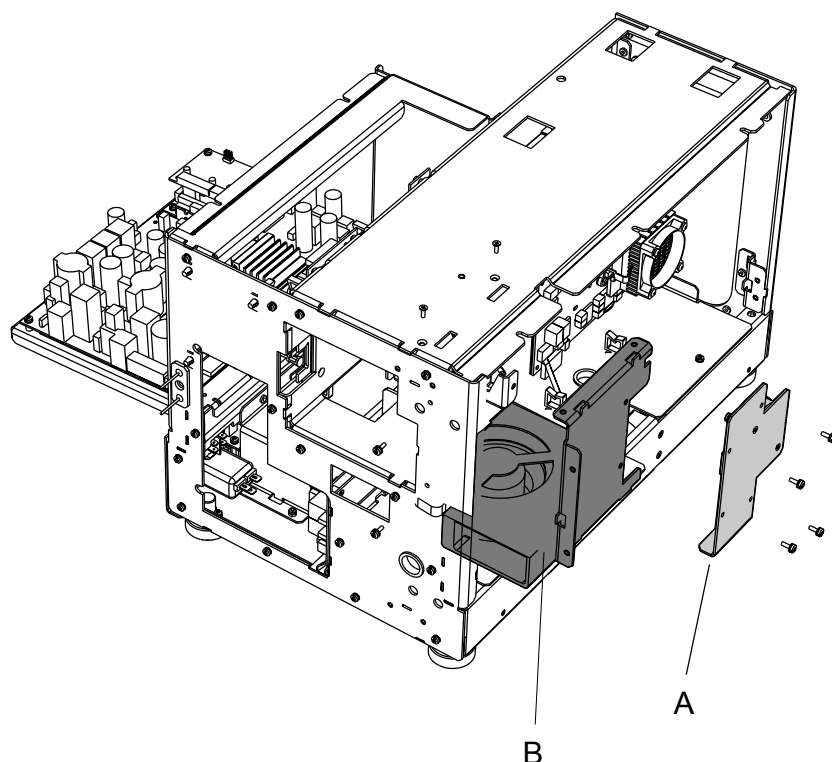


Image 8-12

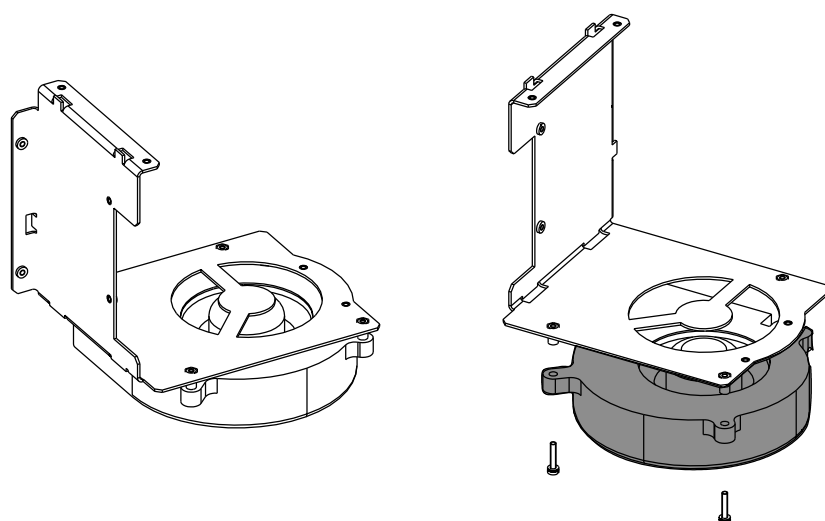


Image 8-13

8.4.3 Replacing the Lamp top fan

How to replace the lamp top fan ?

1. Disconnect the fan from the interconnection unit
2. Loosen the 4 screws and remove the fixation plate, image 8-12
3. Loosen the 2 screws to remove the fan (image 8-14)

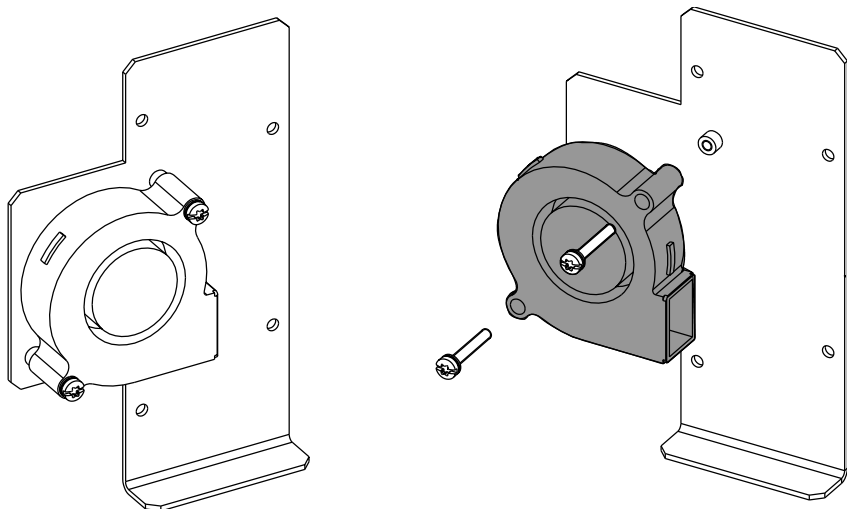


Image 8-14

8.5 Color wheel motor and sensor

Service sheet

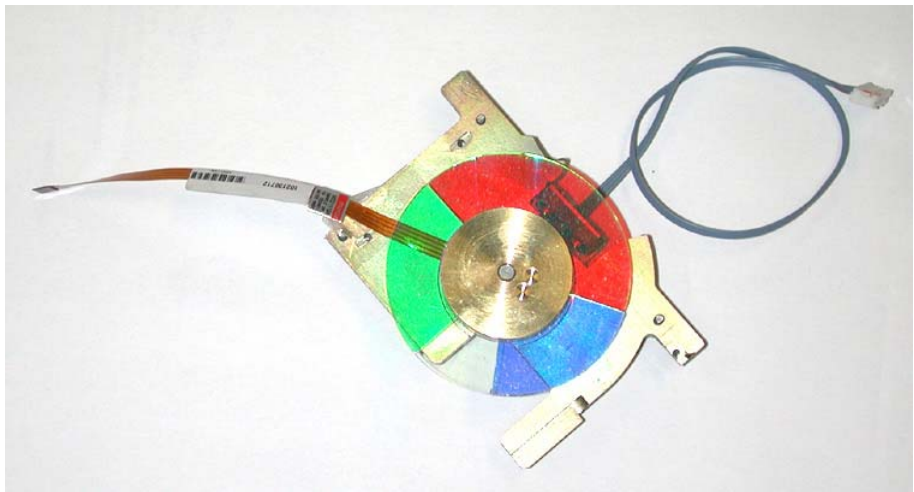


Image 8-15

8.5.1 Description



Spokes

transmission regions between two different color segments

Order information

Partnumber	Description	
R825020K	Color wheel	NR
R764101K	Color wheel sensor	NR

Color wheel control

The color wheel motor is a 3 phase brushless DC motor. The 3 windings are powered by a motor drive circuit on the formatter board, the other side of the windings are put together and form the **centertap**, the voltage of this point is monitored and allows the "simulation" of the back EMF allowing ideal dynamic start up (torque) control.

The control circuit allows a precise speed control through a digital frequency locked loop and linear current control, while the position of the color wheel is determined at any time by means of a sensor print mounted on the same metallic frame, allowing hereby

the synchronization with the lamp and the DMD for lamp power boost and DMD modulation at the right moment (white segment passage).

Speed regulation is adapted to the vertical refresh rates of the incoming signal. For a 50 Hz vertical frequency signal the speed corresponds to 150 Hz i.e. a 3 revolution per frame. For a 60 Hz that would be 180 Hz.

The three switched signals are 120° phase delayed with respect to each other.

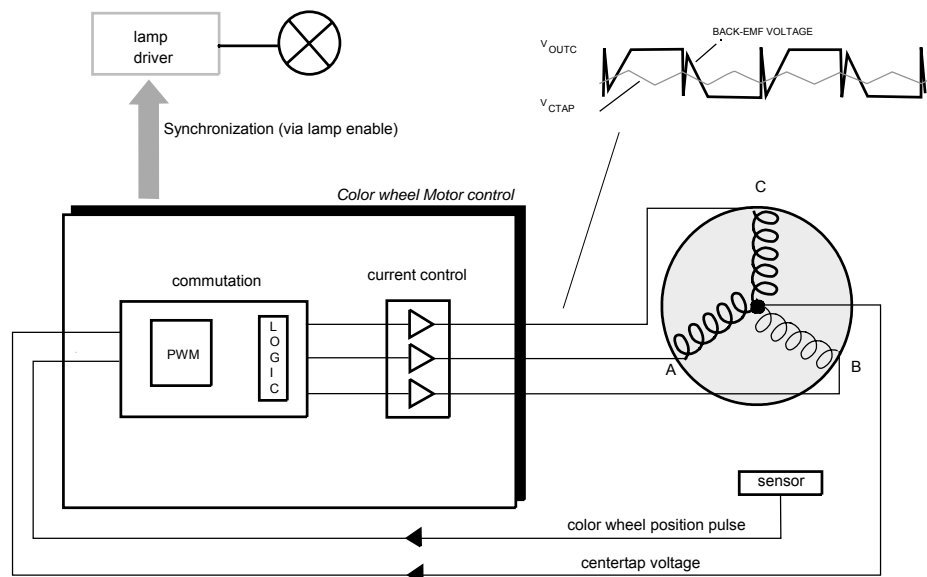


Image 8-16
Color wheel control

8.5.2 Replacing the color wheel

Color wheel Connections

The 3 drive signals and the centertap signal are connected to the formater via the interconnection unit using a flat cable, while the sensor pulse signal is connected using a yellow 3 wire cable (also via the interconnection unit).

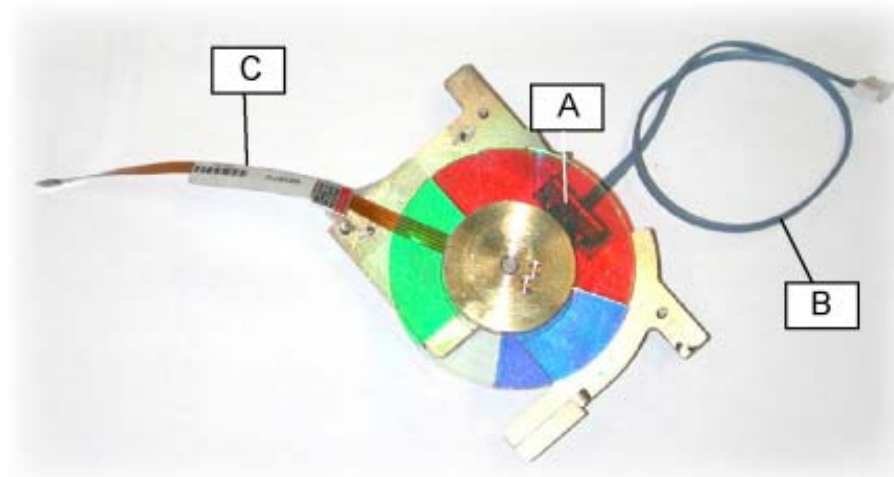


Image 8-17
A sensor
B sensor connection
C motor (flat cable) connection

How to replace the color wheel ?

1. Follow step 1 to 5 of dimmer removal procedure, "Dimmer Motor and Sensor", page 60



for more info on the interconnection unit, see "Interconnection unit", page 49

8.5.3 Color wheel index adjustment



The following procedure is only necessary when the index value is not communicated (label on the color wheel).

If the index value is written on the color wheel label one can put this value in the projector via the OSD (custom value) or use the calibration software to upload the index value as default value into the projector (see “Storing as default”).

Objective

When replacing the color wheel, the color wheel index has to be readjusted.

The physical meaning of the **COLOR WHEEL INDEX** value is described in the image below.

The black arrow corresponds to the rotation sense of the color wheel. The white rectangle describes the position of the timing index mark on the color wheel. This mark rotates along with the Color wheel.

The black rectangle corresponds to the position of the sensor, and the grey rectangle corresponds to the position of the entrance of the light pipe.

The latter two are fixed (and are not related to the position of the color segments R, G, B, W).

The color wheel index value is a value that tells the formatter for how long the color wheel has to rotate before the light coming through the light pipe is completely red (onset of the red segment).

This value is called Δ here.

When the value of Δ is not indicated on the new color wheel use the following procedure to determine this delay.

Here, a difference of 15000 in timing index mark corresponds to 1ms (one complete rotation of the color wheel takes $1/180 \text{ s} \sim 5.56 \text{ ms}$ when an internal pattern is shown, i.e. a 60Hz signal). In addition, we put a fast photo-sensor in front of the projector. This way, we can visualize the color sequential signal on an oscilloscope.

In the setup that has to be used, a connection with the formatter (color wheel timing mark) also has to be made visible on the oscilloscope.

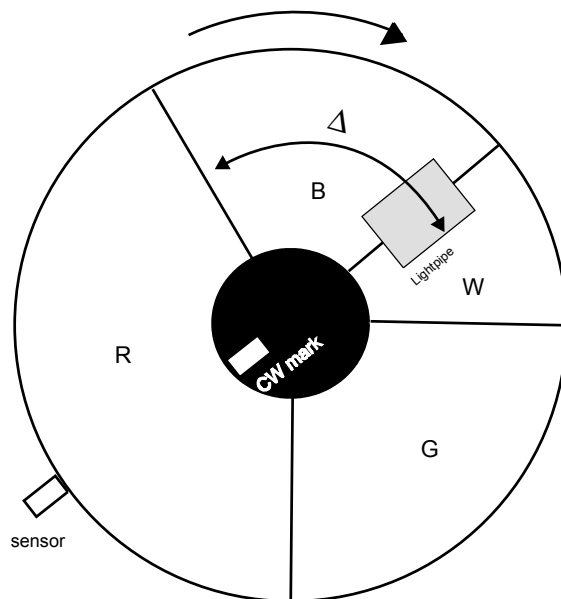


Image 8-18

Δ color wheel index delay

Necessary tools

- PC with Optical Calibration software (WM_optics.exe)
- oscilloscope
- RS232 cable
- fast photodiode

How to start up the CW index adjustment ?

1. When a connection is made with the projector, press the *color wheel index* tab
a dialogbox appears (image 8-19)
2. With the *ENABLE* checkbox checked on, an internal pattern will appear.
This will be a completely white screen (R=255, G=255, B=255).
The checkbox *FULL LIGHT ON* switches to a signal in which the white peaking value is set to 10, if unchecked, WP = 0.
This means that either all light is transmitted, either the light from the white segment and the light from the spokes is completely removed.

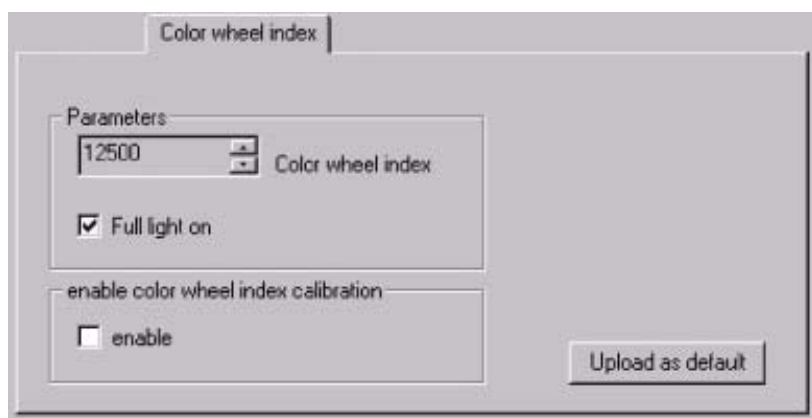


Image 8-19

Measurements and adjustments

On the right, you can see the oscilloscope image (*FULL LIGHT ON* checked).

The upper curve is a signal from the formatter, where you see a rectangular signal every rotation of the Color Wheel.

On the bottom, the signal from the photodiode is seen. Note that the diode has some wavelength dependent sensitivity, and this, combined with the respective lamp efficiency for different colors, results in a plot, where the signal from the red segment is lower than the one from blue, green and white.

If we uncheck the *FULL LIGHT ON* option, the white segment and the spokes are removed (WP = 0),

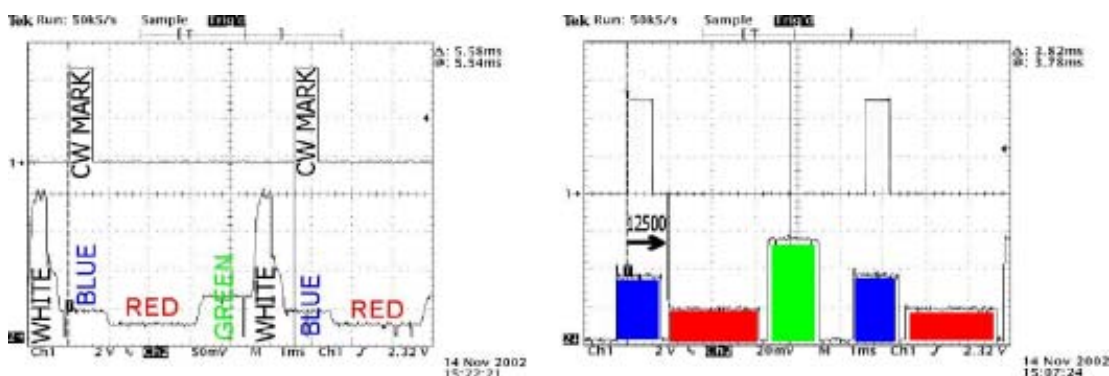


Image 8-20
left image : WP = 10, right image : WP = 0

Here, the color wheel index corresponds to a certain time difference between the onset of the timing mark index and the onset of the red segment (time = x-coordinates on the image).

If we enter 9000 instead of 12500, the formatter thinks that the red segment starts earlier.

On the other hand, if we would enter a value larger than 12500, the formatter will think the red segment starts later, and as a result, it will also include a part of the green segment.

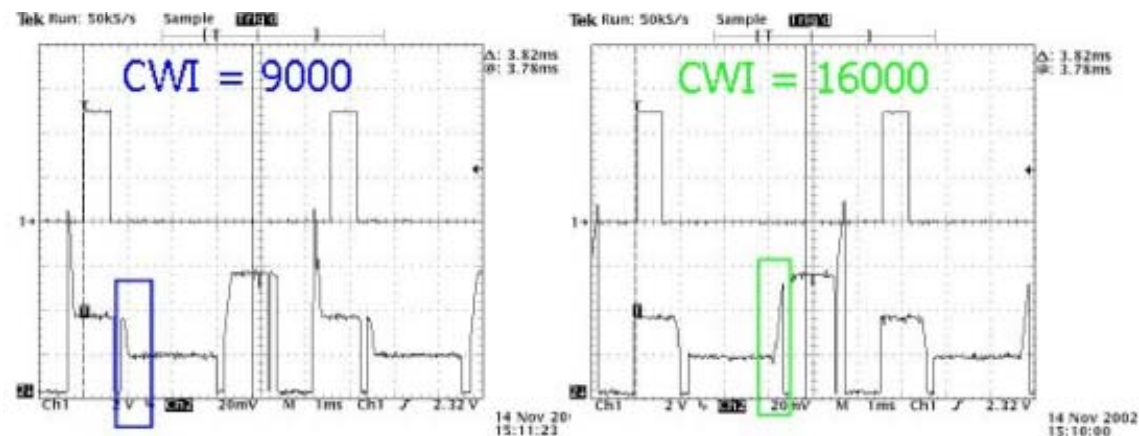


Image 8-21
On the left, we see the result for CWI = 9000. On the right, CWI = 16000 is shown

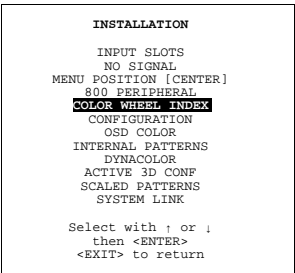
The purpose of the tool is to change the color wheel index until the correct position is found i.e. until the color segment are separated and no slope (slope indicated with rectangle on images) present between them (when WP=0).



When the 'FULL LIGHT ON' option is checked and unchecked, it is easy to see whether the separate color signals are flat or if they have a slope at one of their outer positions.

Storing as default

When this correct position has been found, click the **UPLOAD AS DEFAULT** button to program this value in the projector. This value will be selected when the * button on the remote control is pressed in the menu *COLOR WHEEL INDEX*.



Menu 8-1

9. OPTICAL SPARES AND SERVICING PROCEDURES

Overview

- Accessing the optical components
- UHP lamp
- Lightpipe
- DLP chip and accessories
- Lens holder adjustments

9.1 Accessing the optical components



CAUTION: The access of the optical components is reserved to qualified Barco technicians only !

The removal of the DMD chip and its accessories is very critical and requires the needed precautions and skills.

9.1.1 Access via the backside

When to access the optical components via the backside ?

The access of the following optical components is made possible via the backside of the projector.

- lightpipe
- DLP chip

Therefore the back panel, the formatter and its DMD chip and accessories have to be removed

When servicing the color wheel or dimmer one must access these components via the front side of the projector.

How to remove the formatter board ?

1. Remove the formatter board, see "Replacing the formatter", page 50
2. The optical path is now visible and servicing or adjustments can be done.

See image 9-1.

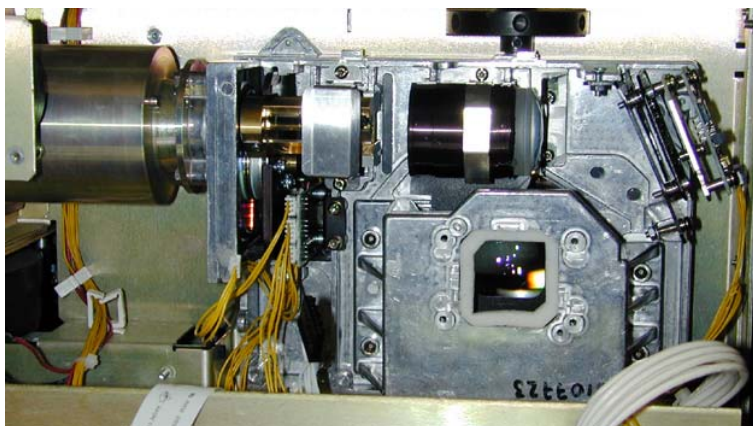


Image 9-1

9.1.2 Access via the front side

When to access the optical components via the front side ?

The access of the following optical components is made possible via the front side of the projector :

- Color wheel (+ sensor)
- Dimmer

These components are protected by a black cover which has to be removed.

How to access the optical components via the front side ?

1. Open the front panel
2. Loosen and remove the 2 screws retaining the black cover (image 9-2)
See image 9-3.



Image 9-2

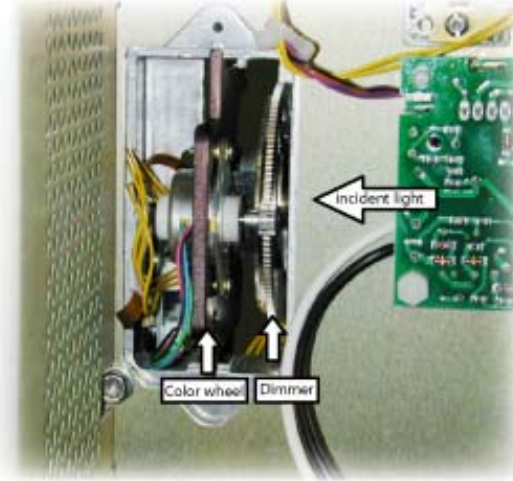


Image 9-3
location of the color wheel and dimmer

9.1.3 Access via the right side

When to access the projector via the right side ?

The lamp is located at the right side of the projector and can be accessed via the right side door.



Image 9-4

9.2 UHP lamp

Service sheet



Image 9-5

9.2.1 Description

Lamp description

The lamp used in the OverView DR120 is a 120W UHP (Ultra High Pressure) lamp.

Partnumber	Description	
R825933	1 lamp	CO

9.2.2 Lamp replacement



CAUTION: Do not touch the cover glass with your fingers. If the lamp is touched, finger prints can be removed by cleaning the lamp with alcohol.

When to replace the lamp?

The lamp must be replaced at the end of lifetime.

Necessary tools

hexagonal ball driver (5)

Start up

1. Push the cursor key ↑ or ↓ to highlight Reset Lamp Run Time. (menu 9-1)
2. Press **ENTER**.

The following warning will be displayed :

Risk of electrical shock. Reset lamp run time is reserved to qualified service personnel. (menu 9-2)

3. Press **ENTER**

See menu 9-3.

4. Enter the serial number of the new lamp
5. Press **ENTER**

```
SERVICE
IDENTIFICATION
CHANGE PASSWORD
CHANGE BAUDRATE PC
RESET LAMP RUNTIME
LAMP RUNTIME HISTORY
LIGHT OUTPUT
VOLTAGE DIAGNOSTICS
MORE...

Select with ; or |
then <ENTER>
<EXIT> to return
```

Menu 9-1

```
WARNING
-----
RISK OF
ELECTRICAL SHOCK
-----
RESET LAMP RUN TIME
is reserved to
qualified
service personnel

<ENTER> to accept
<EXIT> to return
```

Menu 9-2

```
Enter serial number:
-----

<ENTER> to accept
<EXIT> to return
```

Menu 9-3

How to replace the lamp ?

1. Unscrew the hexagonal screw (image 9-6)
2. Open the side door (image 9-7)
3. Disconnect the lamp (image 9-8)
4. Use the long screwdriver to move locking handle downwards to unlock the lamp. (image 9-9)
5. Remove the lamp (image 9-10)
6. Mount the new lamp
7. Move lamp locking handle upwards
8. Close and secure the side door



Image 9-6
Location of side door screw

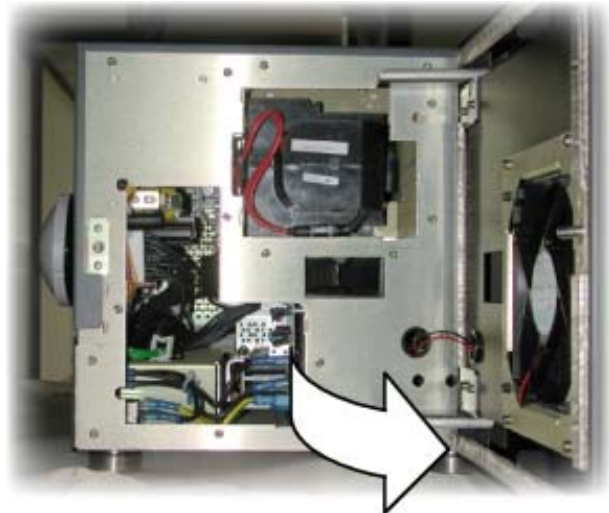


Image 9-7
side door open



Image 9-8
Lamp disconnected

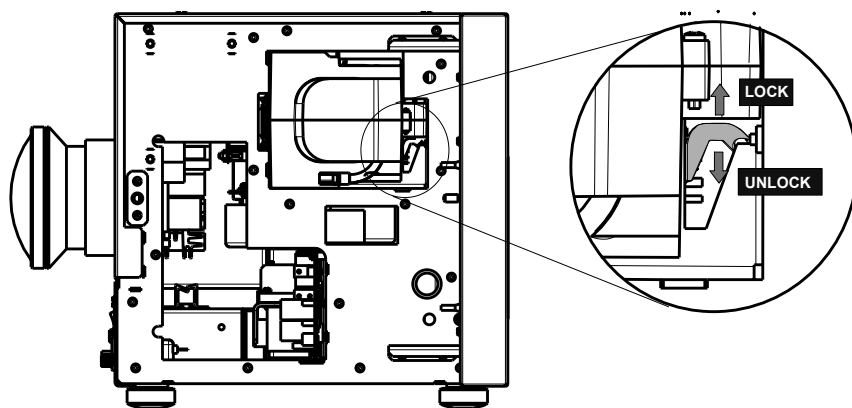


Image 9-9
Lamp locking handle

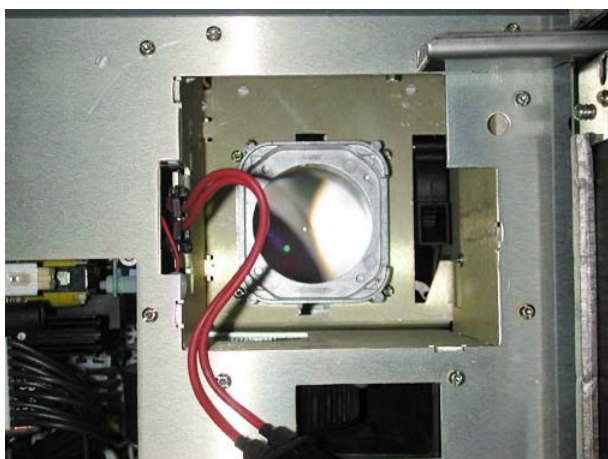


Image 9-10
Lamp removed



When replacing the lamp it is strongly recommended to check and clean (or replace if necessary) the dustfilters.

9.3 Lightpipe

Overview

- Replacing the lightpipe
- Adjusting the lightpipe

Service sheet

9.3.1 Replacing the lightpipe

How to remove the lightpipe ?

1. Remove the formatter to access the optical path, "Access via the backside ", page 71
2. Loosen the 2 screws. (image 9-11)

Caution: Retain the plate while unscrewing to prevent the lightpipe from falling.

See image 9-12, image 9-13.

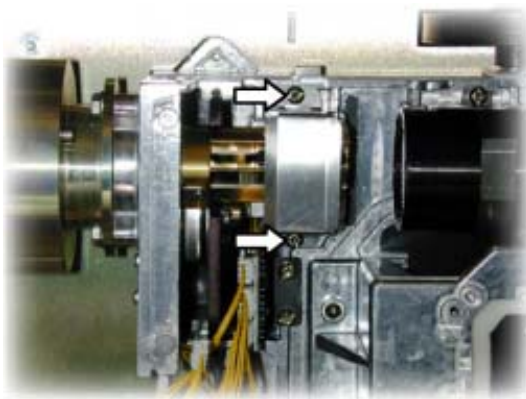


Image 9-11

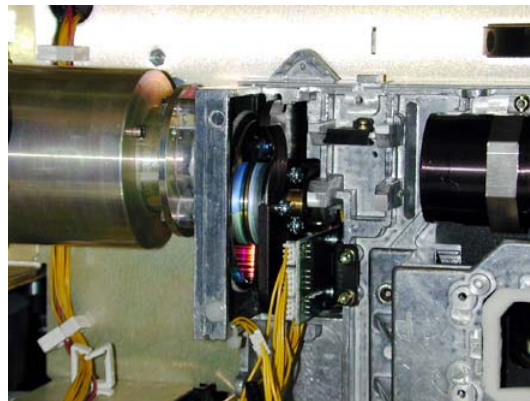


Image 9-12

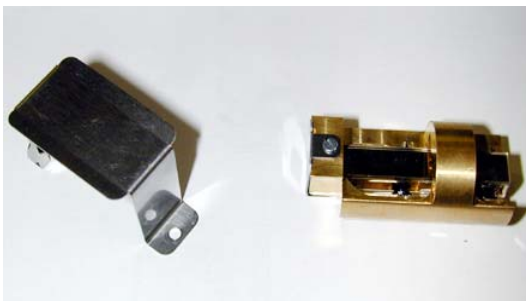


Image 9-13
lightpipe and its plate removed

(Re)placing the (new) lightpipe

1. Mount the lightpipe by reversing above procedure

9.3.2 Adjusting the lightpipe

Which adjustments are possible ?

- Translation of the lightpipe along the optical axis (Z-axis): used to adjust the sharpness of the illuminated area on the DMD.
- Rotation of the lightpipe: used to align (make parallel) the edges of the illuminated area with the edges of the DMD active area.
- Tilting of the folding mirror: used to displace the illuminated area with respect to the DMD active area.

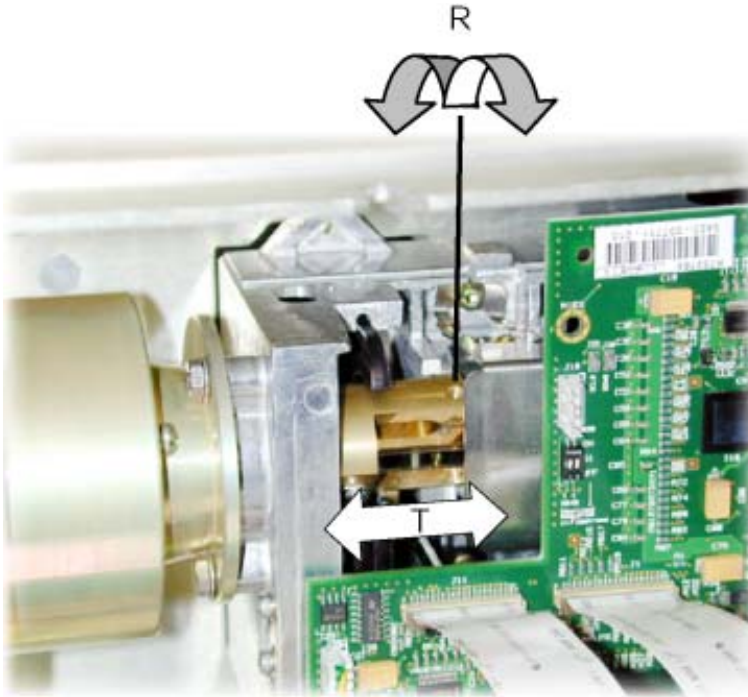


Image 9-14
Lightpipe adjustments

R Rotation
T Translation

Different cases where lightpipe/folding mirror adjustments are required

Lightpipe		Folding mirror	Image
translation	rotation		
NOK	NOK	NOK	image 9-15
NOK	OK	NOK	image 9-16
NOK	OK	OK	image 9-17
OK	OK	NOK	image 9-18
OK	NOK	OK	image 9-19
OK	OK	OK	image 9-20
OK	OK	OK	image 9-21

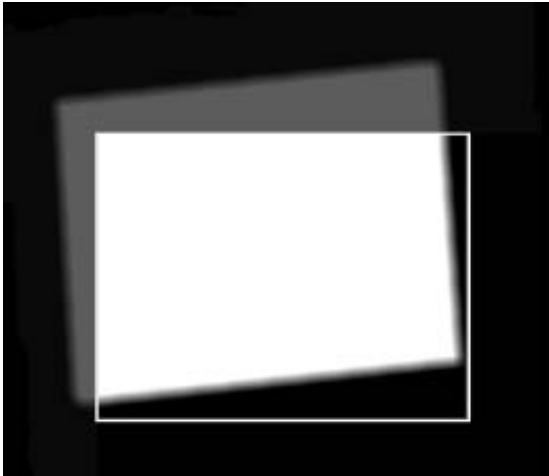


Image 9-15

Case 1 : The image shows a blurred illuminated area, slightly rotated and decentered with respect to the DMD active area (represented by a light hairline for clarity).

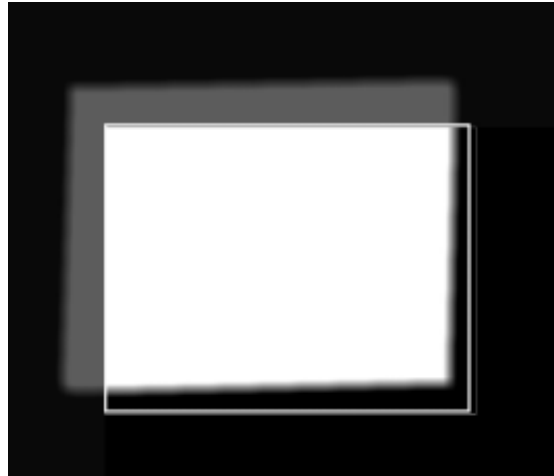


Image 9-16

Case 2 : The image shows a blurred illuminated area, decentered with respect to the DMD active area (represented by a light hairline for clarity).



Image 9-17

Case 3 : because the illuminated area is not sharp enough, some shadowing is visible in the top left and bottom right corner of the image. In practice, this shadow can exhibit some irregular patterning (fringes) and some coloration as well.

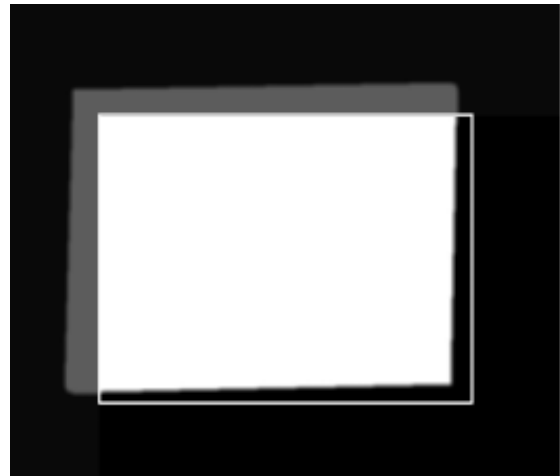


Image 9-18

Case 4 : The image shows a sharp illuminated area, decentered with respect to the DMD active area (represented by a light hairline for clarity). Note that the illuminated area will never be perfectly sharp. In practice, it is necessary to find out the sharpest situation



Image 9-19

Case 5 : The image shows a sharp illuminated area, rotated with respect to the DMD active area (represented by a light hairline for clarity).



Image 9-20

Case 6 : The image shows a sharp illuminated area, which is correctly aligned with respect to the DMD active area.



Image 9-21
With a BLACK test pattern, the illuminated area around the DMD active area ("overfill") becomes much more visible. This can be used for fine tuning of the centering/rotation of the illuminated area



First of all, the folding mirror has to be set in NOMINAL position with screws A, B and C.

Once the mirror is in nominal position, only screws A and B should be used for fine adjustment

How to adjust the lightpipe/folding mirror ?

1. Adjust roughly the folding mirror (screws A and B only) and the lightpipe rotation in order to have something similar to CASE 2 here above.
The important thing is that you must see one of the two corners that has to be sharply imaged (that is one of those along the short diagonal of the parallelogram shaped illuminated area). (image 9-22)
2. Adjust the sharpness in this corner with the lightpipe Z-axis adjustment mechanism (sheet metal plate).
3. Lock the lightpipe Z-axis adjustment mechanism.
4. Adjust the folding mirror and the lightpipe rotation (you may need a few iterations) in order to get the illuminated area perfectly centered and aligned with the DMD active area. When adjusting the lightpipe rotation, it is necessary to keep the lightpipe holder slightly pressed against the Z-axis adjustment mechanism, in order to keep the focus.
5. For fine adjustment, switch to a BLACK image test pattern, in order to clearly see the illumination overfill.
6. At the end of the adjustment, always check on a WHITE image that no shadows or dark/colored fringes are visible in the DMD active area.
7. Lock the lightpipe rotation and check one more time the absence of any artifact at the edge of the DMD active area (WHITE image).

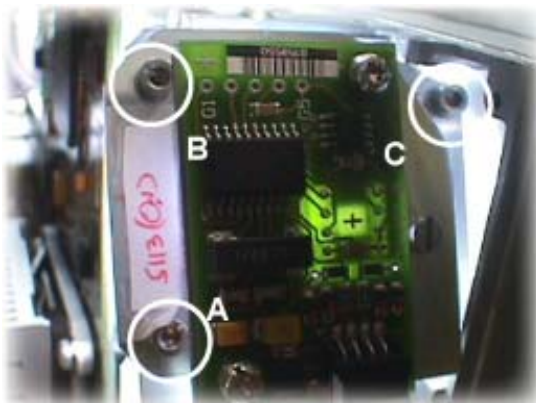


Image 9-22

9.4 DLP chip and accessories

Description

Image	Partnumber	Description	
1	B400548K	DLP chip	NR
2	B400614K	DLP Interposer	NR

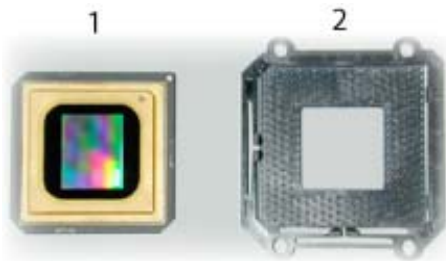


Image 9-23

DMD fixation system

The DLP chip is in a certain way the component which forms the link between the optical system and the electronic part of the projector, it must be placed in the optical path and at the same time it must be connected to the formatter from which it receives its control signals.

To achieve this, the DLP chip is placed between the optical path and the formatter.

A mechanical "sandwiching" assembly allows the DLP chip to make contact with the formatter's bottom PCB by securing it between both formatter and prisma bridge.

At the same time it fixes the formatter to the projector frame, i.e. to remove the formatter one must remove the DLP chip and its assembly.

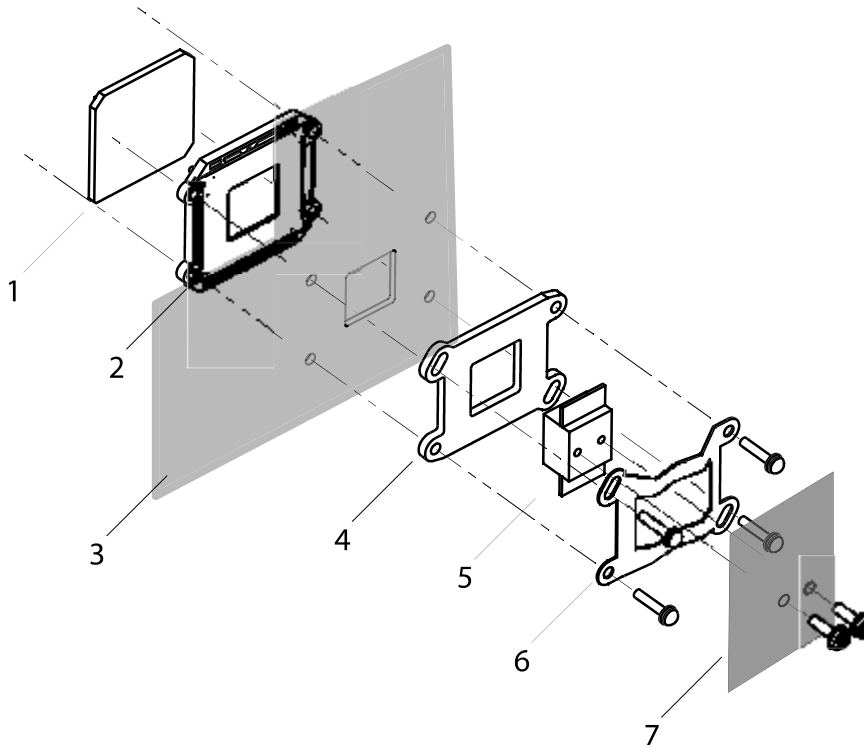


Image 9-24
DLP chip fixation assembly

- 1 DLP chip
- 2 interposer (contact housing)
- 3 formatter
- 4 backer plate
- 5 stud
- 6 spring, stud retainer
- 7 heatsink



A thermal pad as well as an insulator plate are used and inserted respectively between the stud and the DLP chip, and between backer plate and interposer

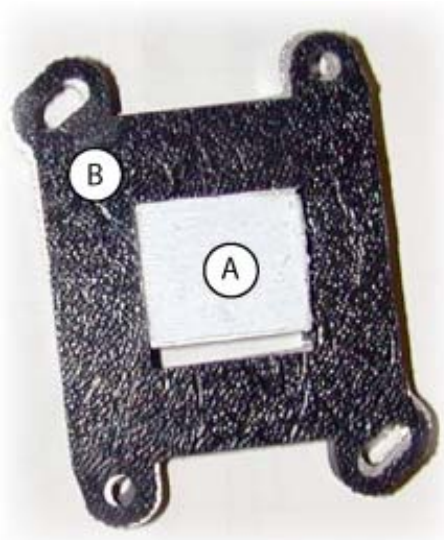


Image 9-25

- A thermal pad
- B insulator pad



CAUTION: For long term storage (greater than one week), sockets should be stored in conditions between 40 and 80 degrees F, and between 30 and 60 per cent relative humidity.

Interposer handling Precautions

- Sockets should always be handled by the outer frame only. .
- Contacts should not be touched with fingers, tools, wipes, or any other devices.
- Sockets should be left in the manufacturer's original shipping trays, with tray covers intact, until assembly.
- The socket should not be exposed to liquids or dry chemicals
- Once the DLP chip has been laid into place, it should be pressed into the socket downward or z-axis force (perpendicular to the mating surface of the contact housing) using uniform, gentle finger pressure applied to the top of the module. The module should NOT be inserted into the socket by first engaging one corner or edge of the module into the contact array and wiping the module corner or edge across the array.

How to remove the DLP chip and its interposer ?

1. see "Access via the backside ", page 71



CAUTION: Never touch the gold contacts on the chip, on the interposer or on the formatter ! Fingerprints may damage the chip.



When replacing the DLP chip/interposer assembly be sure that the + sign (screened on chip) is located at the top/right corner.

9.5 Lens holder adjustments

Introduction

Focus/zoom adjustments are possible on the lens itself but adjusting the lens holder allows a good margin afterwards.

Overview

- Scheimpflug Adjustment
- Focus adjustment

9.5.1 Scheimpflug Adjustment

Overview

- Scheimpflug Adjustment Overview
- Top–Bottom Scheimpflug Adjustment
- Left-Right Scheimpflug Adjustment

9.5.1.1 Scheimpflug Adjustment Overview

Why performing the Scheimpflug Adjustment?

Scheimpflug Adjustment is needed If an image is still unsharp, even after the focus adjustment.

This means the image lies in a plane which is not parallel to the screen plane, as the deviation between the image plane and the screen plane can be in both the Top-Bottom and Left-Right directions, it is necessary to proceed in two distinct steps in following order).

Scheimpflug Adjustment Overview

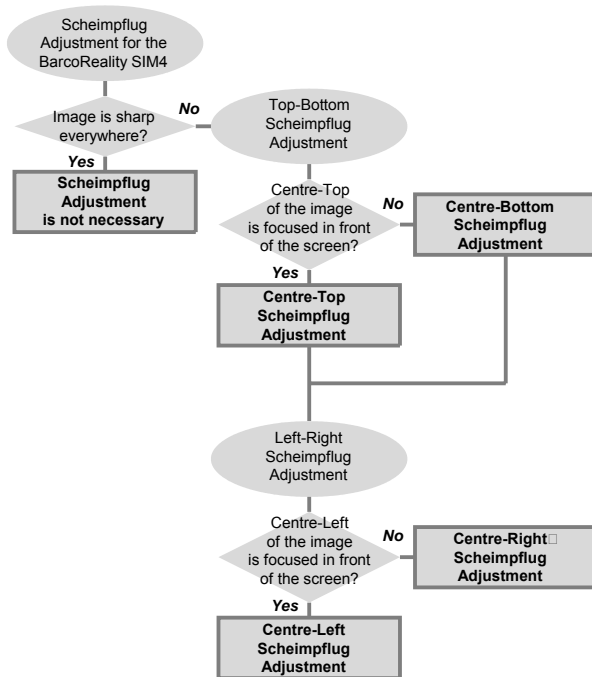


Image 9-26
Scheimpflug Adjustment Overview

Necessary Tools

- Piece of white cardboard.
- M5 Hexagonal Allen™ key.

9.5.1.2 Top–Bottom Scheimpflug Adjustment

How to start the Top–Bottom Scheimpflug Adjustment?

1. Find out whether the centre-top or centre-bottom area of the image is focused in front of the screen. To do this, hold the piece of white cardboard parallel to the screen plane and displace it from the screen towards the projector, along the line joining the centre of the screen and the projection lens.
2. Is the centre-top area of the image focused in front of the screen?
If yes, Proceed with the Centre–Top Scheimpflug Adjustment.
If no, The centre-bottom area of the image is focused in front of the screen, proceed with the Centre–Bottom Scheimpflug Adjustment.

Centre–Top Scheimpflug Adjustment

1. Unscrew bolt B (max 1/8th of a turn) and screw bolt C by approximately the same amount. (image 9-27, image 9-28)
2. Check if the top area of the image is still focused in front of the screen.
3. Repeat steps 1 and until the centre-top of the image is focused on the screen, together with the centre and centre-bottom areas).

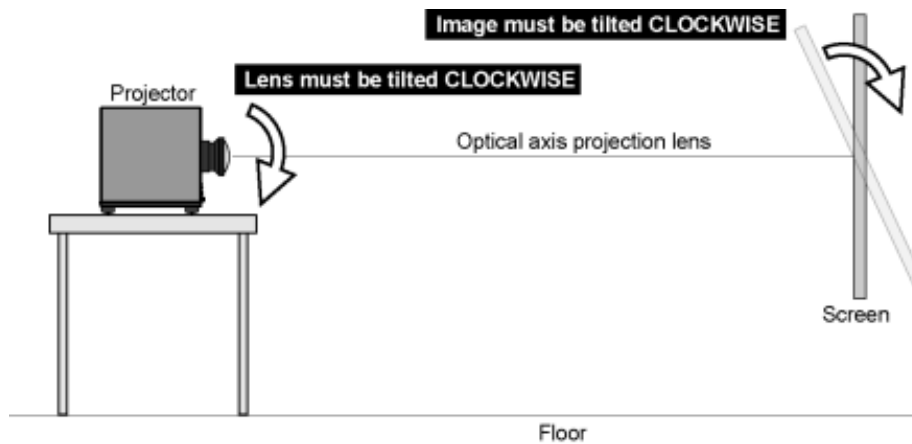


Image 9-27
Lens must be tilted clockwise



Image 9-28
Centre-Top Scheimpflug Adjustment

Centre-Bottom Scheimpflug Adjustment

1. Screw bolt B (max $1/8^{\text{th}}$ of a turn) and unscrew bolt C by approximately the same amount. (image 9-29, image 9-30)
2. Check if the bottom area of the image is still focused in front of the screen.
3. Repeat steps 1 and 2 until the centre-bottom of the image is focused on the screen, together with the centre and centre-top areas).

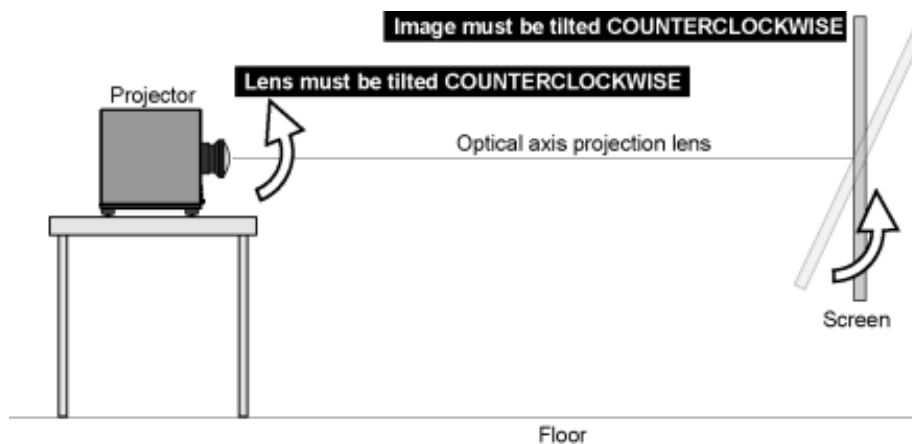


Image 9-29
Lens must be tilted counterclockwise



Image 9-30
Centre-Bottom Scheimpflug Adjustment

9.5.1.3 Left-Right Scheimpflug Adjustment

How to start the Left-Right Scheimpflug Adjustment?

1. By using the same piece of white cardboard, find out whether the centre-left or centre-right area of the image is focused in front of the screen.
2. Is the centre-left area of the image focused in front of the screen?
If yes, Proceed with the Centre-Left Scheimpflug Adjustment.
If no, The centre-right area of the image is focused in front of the screen, proceed with the Centre-Right Scheimpflug Adjustment.

Centre-Left Scheimpflug Adjustment

1. Screw bolt A (max 1/8th of a turn) and unscrew bolts B and C by the same amount. (image 9-31, image 9-32)
2. Check if the left area of the image is still focused in front of the screen.
3. Repeat steps 1 and 2 until the centre-left area of the image is focused on the screen (together with the centre and the centre-right areas).

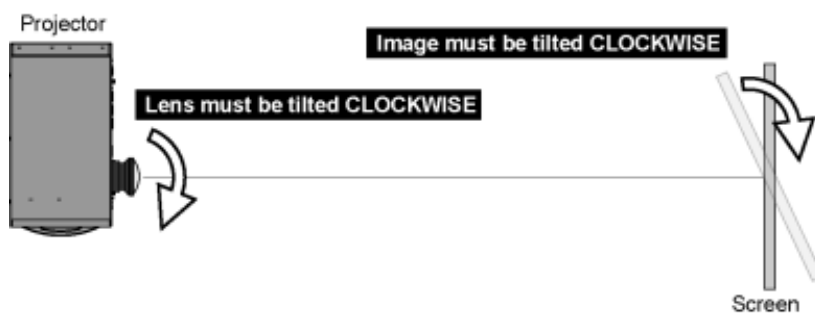


Image 9-31
Lens must be tilted clockwise



Image 9-32
Centre-Left Scheimpflug Adjustment

Centre-Right Scheimpflug Adjustment

1. Unscrew bolt A (max 1/8th of a turn) and screw bolts B and C by the same amount. (image 9-33, image 9-34)
2. Check if the right area of the image is still focused in front of the screen.
3. Repeat steps 1 and 2 until the centre-right area of the image is focused on the screen (together with the centre and the centre-left areas).

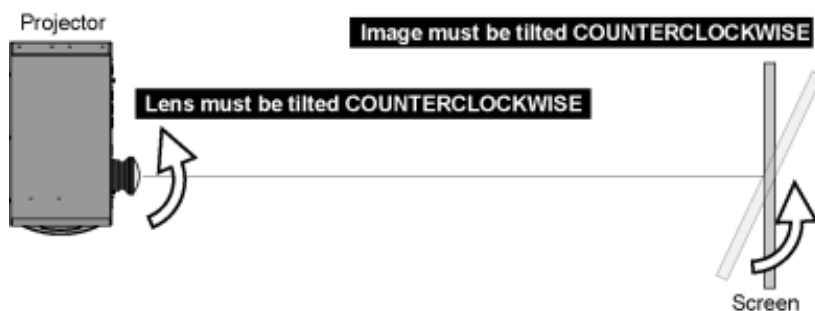


Image 9-33
Lens must be tilted counterclockwise



Image 9-34
Centre-Right Scheimpflug Adjustment

9.5.2 Focus adjustment

When is it necessary ?

Check the sharpness of the image in the central part of the screen.

If the image is sharp (central part only !), then no focus adjustment is necessary.

Necessary tools

- M5 hexagonal key
- cardboard

What should be adjusted ?

With the aid of a piece of white cardboard, find out whether the sharp image is in front or behind the screen.

1. Hold the cardboard parallel to the screen plane and displace it from the screen towards the projector, along the line joining the centre of the screen and the projection lens.
2. If it is possible to find a sharp image between the projector and the screen, then the image is in front of the screen. Otherwise, the image is behind the screen

When the image is in front of the screen

1. Screw slightly all bolts A, B and C by the same amount (projection lens gets deeper in the projector), until the central part of the image appears sharp on the screen (image 9-35)

Tip: Proceed by quite small steps ($1/8$ th to $1/4$ th of a turn maximum) as the image moves very quickly.

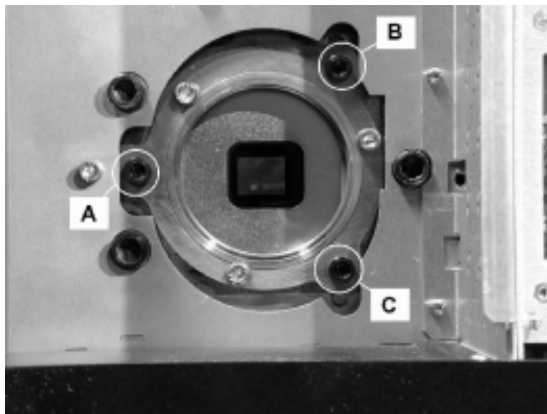


Image 9-35
Focus/Scheimpflug adjustment screws

When the image is behind the screen

1. Unscrew all bolts A, B and C by the same amount (projection lens gets outer of the projector), until the image central part appears sharp on the screen, image 9-35

10. TROUBLESHOOTING

Overview

- Troubleshooting using the display
- History and diagnostics using the OSD menu

10.1 Troubleshooting using the display

Error codes

The OverView DR120 uses 7 segment LED display, located on the front input panel, which allows the user to be informed of the possible error occurred during operation or in the start up phase.

2 type of errors may occur:

- **Y_i** : error has occurred during operations and causes the projector to shut down or not, in some cases a warning message is shown on the screen (OSD)
- **U_i** : error has occurred during the start up of the projector, the projector will remain in standby



Image 10-1
LED Display

Overview

Code	Name	OSD warning	Possible cause	More info
Y1	PWR_GOOD		1. One or more of secondary supply voltages NOK	"Diagnostics on SMPS", page 33
Y2	OVERTEMP_PFC		2. PFC heatsink too hot, Power fan not cooling (enough)	"Fan control", page 37
Y3	UNDERVOLTAGE		1. PFC output voltage too low (PFC < 375VDC)	"Power Factor Corrector (PFC)", page 27
Y4	FAN FAIL 1		1. Fan fail circuit 1: Power fan blocked, disconnected or broken	"Fan control", page 37
Y5	FAN FAIL 2		1. Fan fail circuit 2: lamp, lamp top or Warp fan blocked, disconnected or broken.	"Fan control", page 37
Y6	OVERTEMP_LAMP		1. Lamp housing is too hot 2. lamp temp sensor switch broken	
Y7	OVERTEMP_AMB		Ambient temperature too high (approx >40°C)	
U1	PFC doesn't start		1. PFC output voltage too low (PFC < 375VDC) 2. mains voltage too low	"Power Factor Corrector (PFC)", page 27
U2	fans don't start		1. Fans may have been blocked during start up	

Code	Name	OSD warning	Possible cause	More info
U3	SMPS doesn't start		2. One or more of the secondary supply voltages is NOK	"Switched Mode Power supply (SMPS)", page 30
U4	UNDERTEMP_AMB		1. Ambient temperature is too low (approx <5°C)	"Fan control", page 37
U5	SW incompatibility		Software version doesn't support the Warp board version.	

10.2 History and diagnostics using the OSD menu

10.2.1 Shutdown History

What can be done?

The Projector will keep a history of the 5 recent failures, along with the Lamp Runtime on which the failure happened, that caused a shutdown of the projector.

Following Failures are logged:

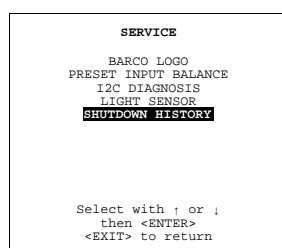
- PWR_GOOD FAILED
- OVERTEMP PFC OCCURED
- UNDERVOLTAGE FAILED
- FAN 1 FAILED
- FAN 2 FAILED
- OVERTEMP_LAMP OCCURED
- OVERTEMP_AMB OCCURED

How to display the Shutdown History info?

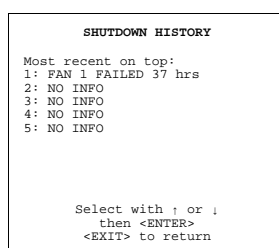
1. Push the cursor key ↑ or ↓ to highlight *Shutdown History*. (menu 10-1)
2. Press **ENTER** to select.

The *Shutdown History* information screen will be displayed. (menu 10-2)

3. Press **EXIT** to return to the *Service Mode* menu.



Menu 10-1



Menu 10-2

How to display the Detailed Shutdown History info?

1. Push the cursor key ↑ or ↓ to highlight the desired Shutdown e.g. the most recent. (menu 10-3)
2. Press **ENTER** to select.

The Detailed Shutdown History, showing the Voltage Diagnostics measured on the time the Shutdown happened, will be displayed. (menu 10-4)

3. Press **EXIT** to return to the *Shutdown History* information screen.

```

SHUTDOWN HISTORY
Most recent on top:
1: FAN 1 FAILED 37 hrs
2: NO INFO
3: NO INFO
4: NO INFO
5: NO INFO

Select with ↑ or ↓
then <ENTER>
<EXIT> to return

```

Menu 10-3

```

DETAILED SHUTDOWN HISTORY
1: FAN 1 FAILED
++24V: 27.56
++5V: 5.20
--8V: -8.87
-8V: -8.87
+15.5V: 15.39
+5V: 5.13
+3.3V: 3.26
+2.5V: 2.61
+12V: 11.98

LAMP RUNTIME: 37 hrs

<EXIT> to return

```

Menu 10-4

10.2.2 Voltage Diagnostics

What can be done?

The Voltage Diagnostics info screen will display, in real time, the numeric values of the different voltages used in the projector.

How to consult Voltage Diagnostics?

1. Push the cursor key ↑ or ↓ to highlight *Voltage Diagnostics*. (menu 10-5)
2. Press **ENTER** to select.

The Voltage Diagnostics info screen will be displayed. (menu 10-6)

```

SERVICE
IDENTIFICATION
CHANGE PASSWORD
CHANGE PROJ. ADDRESS
CHANGE BAUDRATE PC
RESET LAMP RUNTIME
LAMP RUNTIME HISTORY
LIGHT OUTPUT
VOLTAGE DIAGNOSTICS
MORE...

Select with ↑ or ↓
then <ENTER>
<EXIT> to return

```

Menu 10-5

```

VOLTAGE DIAGNOSTICS
++24V: 27.56
++5V: 5.20
--8V: -8.87
-8V: -8.87
+15.5V: 15.39
+5V: 5.13
+3.3V: 3.26
+2.5V: 2.61
+12V: 11.98

<EXIT> to return

```

Menu 10-6

10.2.3 I²C Diagnosis

What can be done?

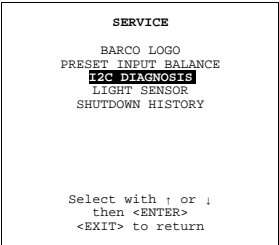
This info screen will give an overview of the Data, Command and Address status of the I²C controlled IC's (Green box = OK, Red Box = Error, the Box in the menu is shown as #).

Following IC's are shown in the I²C info screen.

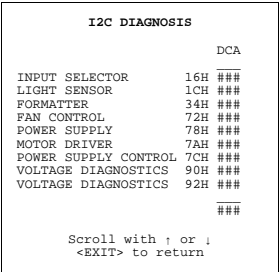
- Input Selector
- Light Sensor
- Formatter
- Fan Control
- Power Supply
- Motor Driver
- Power Supply Control
- Voltage Diagnostics (3x)

How to consult the I²C Diagnoses?

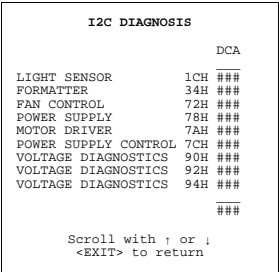
- 1. Push the cursor key ↑ or ↓ to highlight *I²C Diagnosis*. (menu 10-7)
- 2. Press **ENTER** select.
The I²C info screen will be displayed. (menu 10-8)
- 3. Push the cursor key ↓ to scroll down and display the bottom line of the I²C info screen. (menu 10-9)
- 4. Press **EXIT** to return to the *Service Mode* menu.



Menu 10-7



Menu 10-8



Menu 10-9

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Revision Sheet

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Date: _____

Please correct the following points in this documentation (**R5976794/00**):

page	wrong	correct